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REVIEW OF AUSTRALIAN SPECIES OF *TRIAENODES* MCLACHLAN (TRICHOPTERA: LEPTOCERIDAE)

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Abstract

Neboiss, A. and Wells, A., 1998. Review of Australian species of *Triaenodes* McLachlan (Trichoptera: Leptoceridae). *Memoirs of the Museum of Victoria* 58: 89–132.

Australian representation in the widespread leptocerid caddisfly genus *Triaenodes* is reviewed and forms the basis for a brief discussion of *Triaenodes* subgenera. The Australian fauna comprises 48 species, 44 newly described. All species occur within the 500 mm rainfall isohyet, mostly in the northern and eastern to southeastern coastal fringe of the continent. These factors, as well as the occurrence of almost 63 % of the species in the northern or Torresian biogeographical province, and apparent patterns in male genitalic form, support the idea of a relatively recent Oriental origin for the genus in Australia. A key is provided to males of Australian species.

Introduction

Triaenodes McLachlan, 1865 (Trichoptera: Leptoceridae) is one of the most diverse leptocerid genera in Australia, with some 48 species. Until now, however, only four of these were named. Heralding this review in a brief conference paper (Neboiss and Wells, 1996), we discussed features of the Australian fauna, and particularly the difficulties of determining homologies among male genitalic structures. We presented a phylogeny for sets of species among the Australian fauna, and on the basis of that, questioned the validity of the three established *Triaenodes* subgenera. Here we describe 44 new species, consider their relationships, and examine their distributions.

In Australia, *Triaenodes* appears to be restricted to the coastal fringe of the continent and Tasmania, occurring from southwestern to northwestern Western Australia, across the north, south along the Great Dividing Range to Tasmania, and as far west as southern South Australia. Thus, the genus lies within the 500 mm isohyet (see Neboiss, 1981) and in this respect, differs from at least two of the other leptocerid genera that are well represented in Australia—*Triplectides* Kolenati, 1859 and *Oecetis* McLachlan, 1877—which are also present in the scattered water bodies of arid Australia. *Triaenodes volda* Mosely and Kimmins, 1953 and *T. bernaysae* Korboot, 1964 are both from southeastern Queensland, *T. intricata* Neboiss, 1977 from Tasmania and T. jubatus Neboiss, 1982 from southwestern Western Australia. The new species are mostly from northern and eastern localities (Table 1). Interestingly, for this genus as for many other aquatic groups, a northern or Torresian and a southern or Bassian fauna can be recognised, there being a clear disjunction or faunal barrier in the Townsville-Rockhampton area (Neboiss, 1981). Close to 63 % of Australian *Triaenodes* species are Torresian. Only *Triaenodes volda* and *T. stipulosa* sp. nov. are recorded from both faunal provinces, the latter from the northern part of the Bassian province only. For some species, the apparently limited distributions probably reflect the paucity of collecting, but for others such as those occurring in Victoria and Tasmania, they are probably real. The preponderance of northern species and the close affinities of some of these to species in New Guinea and the Western Pacific suggests that the advent of *Triaenodes* in Australia may be relatively recent. This hypothesis is supported by the presence of what appear to be sets of closely

Table 1. Torresian (northern) and Bassian (southern) species among Australian *Triaenodes*.

Torresian species (northwestern WA, northern Qld, NT)
allax, ataloma, barbarae, camura , celata, copelata, corynotra, dibolia, doryphora, drepana, dysmica, empheira, etheira, gibberosa, laciniata, mataranka, melanopeza, mouldsi, nymphaea, probolia, reclusa, rutella, tenerata, teresis, theiophora, torresiana, toxeres, triquetra, verberata, virgula
Bassian species (southern Qld, NSW, Vic., Tas., SA, southwestern WA)
bernaysae, conjugata, cuspiosa, cymulosa, forficata, fuscinula, implexa, intricata, jubatus, nesiotina, notalia, perissotes, resima, uvida, vespertina, wannonense
Species common to both provinces
stipulosa, volda

related forms, which one might expect in a group that has radiated recently and is probably still splitting.

On a world scale, the Australian *Triaenodes* fauna is diverse, comprising about one-third of all described species. Elsewhere the genus is known from the Afrotropical, Holaretic and Neotropical regions, and New Guinea. No species are recorded from New Zealand or New Caledonia.

Generic relationships of the world Triaenodini tribe were examined recently by Yang and Morse (1993). They divided species of *Triaenodes* among three subgenera, accorded subgeneric status to *Triaenodella* Mosely, 1932 and erected a new subgenus, *T.* (*Austrotriaena*). They assigned Australian/Australasian species to each of these subgenera, and to the nominate subgenus. Neboiss and Wells (1996) invoked a slightly different interpretation of homologies among male genitalic structures, following which Australian species fall into two main groups which cut across those proposed by Yang and Morse.

The main point of contention between our interpretation and that of Yang and Morse (1993) is the true nature of the structures associated with the inferior appendages that they term the basal plate process and the mesal basodorsal process. Close scrutiny of these structures in several North American species fails to convince us that they are other than the homologues of a structure which, among the diverse Australian species, exhibits forms grading between the putatively separate structures.

As with this process, other male genitalic structures of Australian species also show extraordinary ranges of variation and in diverse combinations. In many instances, the variation, particularly in relative proportions of structures, makes precise verbal definition of species difficult—figures are far more informative. Patterns such as this conceivably indicate relatively recent radiations of the group. The variants are unique, and differences are generally in shapes of parts, not presence or absence. Radiations appear to have occurred in various directions, producing, by and large, a stellate effect—a polytomy, also suggestive of recent divergence, or rapid diversification (see Hoelzer and Melnick, 1994). Our phylogenetic analysis (Neboiss and Wells, 1996) produced little resolution and subsequent attempts to redefine characters and interpret relationships have proved difficult.

Four Australian species are separated from the rest by a clear disjunction—their male genitalia lack superior appendages, and show close similarities in other features. Thus, this *volda*-group is clearly monophyletic. For the remaining and large group of Australian species, here termed the *intricata*-group, monophyly was shown to be weakly supported. This group is here divided into sets, termed "complexes" for convenience of communication. Now designated by species names, these complexes correspond to sets recognised by Neboiss and Wells (1996), most of which were shown to be supported only weakly by synapomorphies.

A fascinating aspect of this and other studies on leptocerid genera is that repeatedly the same general male genitalic forms reappear in separate groups. Unlike the generally clearcut wing and general body features that diagnose these genera, male genitalic features appear to be very plastic. Often they show complex and apparently highly specialised arrangements that seem, intuitively, to represent derived states. The more parsimonious explanation is that groups having these are relatively basal in the family, the codes for their development having persisted in the genome under control of regulators which suppress expression of the genes, unless reactivated. The alternative explanation that they have arisen *de novo* on repeated occasions seems less probable.

Loss of specialised genitalic structures—structures which play critical roles in lock-and-key type mate recognition—may not be so improbable. Such loss could well accompany increased development of different sets of features, such as pheromone systems or courtship rituals. Similarly, the small interspecific differences seen in male genitalic form in some of the "complexes" could be inconsequential for species recognition compared with differences in patterns of behaviour. Comparative studies of behaviour in some of these groups could be very rewarding.

In some instances, though, the component structures of superficially similar male genitalic arrangements certainly do appear to be homoplaseous. For example, the parameres of *Setodes* species (illustrated with splendid clarity by Schmid (1987), resemble, in both appearance and juxtaposition, the spines formed by the mesal basodorsal process on the inferior appendages of *Triaenodes* species such as *T. mouldsi* sp. nov. or *T. teresis* sp. nov., or even parts of tergum X as in *T. copelata* sp. nov. The selective pressures for development or expression of these sorts of characters could also be particular behaviours. The structures involved could play à role in male-male agressive interactions, rather than having a direct function in the copulatory process, and as such be subject to strong directional selection.

Material examined is in the collections of the Museum of Victoria, Melbourne (NMV), Australian National Insect Collection, Canberra (ANIC), Queensland Museum, Brisbane (QM) and the Northern Territory Museum of Arts and Sciences, Darwin (NTM). Specimens were prepared for study following the method outlined by Neboiss (1994). Dissected specimens are identified by Neboiss' notebook numbers with the prefix PT on a yellow label. The Natural History Museum, London, is encoded BMNH.

Key to males of Australian *Triaenodes* species

1. Superior appendages absent.....*volda*-group...2
— Superior appendages present.....*intricata*-group.... 5
2. Inferior appendages in ventral view excavated roundly on inner distal margin giving pincer-like appearance.....3
— Inferior appendages in ventral view not excavated on inner distal margin.....4
3. Inner apical excavation, in ventral view, wide and deep, occupying close to half length of inferior appendage (Fig. 3).....*T. volda* Mosely
— Inner apical excavation, in ventral view, short and shallow, occupying about quarter length of inferior appendage (Fig. 5).....*T. dysmica* sp. nov.
4. Inferior appendages, in ventral view, slender, curved to form claspers (Fig. 9).....*T. mataranka* sp. nov.
— Inferior appendages, in ventral view, stout, not clasper-like, length less than twice basal width (Fig. 11).....*T. jubatus* Neboiss
5. Segment IX with a clear and complete ventrolateral suture between tergite and sternite.....6
— Segment IX without a clear and complete ventrolateral suture between tergite and sternite, although an oblique groove may give a false impression of a suture.....9
6. Inferior appendages, in ventral view, basically clasper-like or spiny, length at least 4 × width.....7
— Inferior appendages, in ventral view, irregularly lobose, length about twice width (Fig. 59).....*T. reclusa* sp. nov.
7. Inferior appendages with apices rounded (Figs 49, 50).....*T. celata* sp. nov.
— Inferior appendages spiny, with apices acute.....8
8. Inferior appendages in lateral view only slightly arched downwards (Fig. 52) .....*T. dibolia* sp. nov.
— Inferior appendages in lateral view strongly recurved and arched downwards (Fig. 56).....*T. drepana* sp. nov.
9. Tergum X comprising a single plate only, membranous and simple or bifid, rarely with a slender dorsomedial spine.....10
— Tergum X clearly comprising an upper and a lower part.....19

10. Inferior appendages with mesal basodorsal process in form of a single long recurved spine....11
— Inferior appendage with more than 1 process, or if only mesal basodorsal process present, then as a slender apically setose filament, not a spine....12
11. Inferior appendages, in ventral view, tapered towards apex (Fig. 18)..... ....*T. toxeres* sp. nov.
— Inferior appendages, in ventral view, broad basally, mesal margin abruptly excavated at two-thirds length (Fig. 15)....*T. theiophora* sp. nov.
12. Inferior appendages asymmetrical in ventral view....13
— Inferior appendages symmetrical in ventral view....14
13. Left inferior appendage, in ventral view, with a straight spine near base on inner margin; right inferior appendage with a small expansion in matching position (Fig. 41)....*T. etheira* sp. nov.
— Left inferior appendage, in ventral view, with a slender spine twisting dorsally; right inferior appendage with a short, irregular process (Fig. 47)....*T. rutella* sp. nov.
14. Inferior appendages with a single process, slender and apically setose (Fig. 32)....*T. stipulosa* sp. nov.
— Inferior appendages, in lateral view, with 2 or more processes....15
15. Inferior appendages with a pair of slender, apically setose processes; an additional strap-like process may be present....16
— Inferior appendages with 1 stout apically setose process, and on inner margin subapically a pair of strap-like processes (Fig. 43)....*T. camura* sp. nov.
16. Inferior appendages, in ventral view, stout, with length about twice width at midlength; a small dorsally directed process apically (Fig. 30)..... ....*T. gibberosa* sp. nov.
— Inferior appendages in ventral view, with length at least 3 × width at midlength....17
17. Inferior appendages, in ventral view, almost straight, slightly tapered towards apex; a bifid process dorsally at about two-thirds length (Fig. 27).. ....*T. barbarae* sp. nov.
— Inferior appendages, in ventral view, curved inwards forming claspers....18
18. Inferior appendages, in ventral view, expanded distally; tergum X a simple, distally tapered plate (Figs 19-21)....*T. copelata* sp. nov.
— Inferior appendages, in ventral view, rounded with a dorsal projection apically; tergum X comprising a pair of narrow spines (Figs 22-24)..... ....*T. virgula* sp. nov.
19. Inferior appendages, in lateral view, with a stout lobose to foot or hook-shaped mesal basodorsal process....20
— Inferior appendages, in lateral view, with mesal basodorsal process divided into 2 spines or slender almost filamentous structures or irregularly divided 29
20. Inferior appendages, in ventral view, almost isosceles triangle-shaped, with a pair of stout, spur-like setae on inner apical margin (Figs 110, 112, 114).. ....*T. triquetra* sp. nov.
— Inferior appendages, in ventral view, not as above....21
21. Basal process of inferior appendages, in lateral view, recurved, almost even width throughout length, swollen slightly near base or at about one-third length....22
— Basal process of inferior appendages, in lateral view, broadly swollen medially or distally....23
22. Inferior appendages, in lateral view, broad-based, narrow and upturned distally, in ventral view with apices inturned (Figs 89, 90)..... ....*T. bernaysae* Korboot
— Inferior appendages, in lateral view, skittle-shaped (Fig. 87) ....*T. verberata* sp. nov.

23. Mesal basodorsal process on inferior appendages, in lateral view, blunt or rounded apically.....24
— Mesal basodorsal process on inferior appendages, in lateral view, hooked and acute apically.....26
24. Inferior appendages, in ventral view, stout basally, width more than half length, apically a small spine on inner margin (Fig. 99)....*T. probòlia* sp. nov.
— Inferior appendages, in ventral view, with basal width less than half length 25
25. Inferior appendages, in ventral view, widely curved, with a short stout inner basal lobe bearing bristly setae (Fig. 96).....*T. cuspiosa* sp. nov.
— Inferior appendages, in ventral view, almost straight, without a stout basal lobe (Fig. 93).....*T. corynotra* sp. nov.
26. Mesal basodorsal process on inferior appendages, in lateral view, with median swelling even, not forming a distinct hump (Fig. 103)..... .....*T. vespertina* sp. nov.
— Mesal basodorsal process on inferior appendages, in lateral view, with median swelling abrupt, forming a distinct hump.....27
27. Inferior appendages, in ventral view, elongate, length more than 3 × basal width; mesal basodorsal process, in lateral view, with distal hook longer than height of hump (Figs 106, 107).....*T. forficata* sp. nov.
— Inferior appendages, in ventral view, with length no more than 2.5 × basal width; mesal basodorsal process, in lateral view, with hook no longer than height of hump.....28
28. Inferior appendages, in ventral view, with length less than twice basal width; length of sternite IX nearly 3 × width (Fig. 105).....*T. wannonense* sp. nov.
— Inferior appendages, in ventral view, with length about 2.5 × basal width; sternite IX subquadrate (Fig.102).....*T. notalia* sp. nov.
29. Mesal basodorsal process on inferior appendages a simple elongate recurved spine (Fig. 85).....*T. teresis* sp. nov.
— Mesal basodorsal process on inferior appendages bifid or complexly multi-lobed.....30
30. Mesal basodorsal process on inferior appendages bifid, comprising 2 elongate filaments, spines or lobes, generally, but not always about equal in length.....31
— Mesal basodorsal process on inferior appendages multilobed or highly irregular in shape.....39
31. Mesal basodorsal process on inferior appendages with both lobes setose apically.....32
— Basal process of inferior appendages with 1 lobe setose apically, the other spine-like.....33
32. Mesal basodorsal process on inferior appendages swollen medially (Fig. 67) .....*T. resima* sp. nov.
— Mesal basodorsal process on inferior appendages not swollen medially (Fig. 62).....*T. implexa* sp. nov.
33. Spiny branch of mesal basodorsal process on inferior appendages, in lateral view, clearly at least twice length of apically setose branch.....34
— Spiny branch of mesal basodorsal process on inferior appendages, in lateral view less than twice length of apically setose branch.....37
34. Upper branch of tergum X not trifurcate apically (Fig. 80)..... .....*T. mouldsi* sp. nov.
— Upper branch of tergum X trifurcate apically.....35
35. Inferior appendages, in lateral view, tapered towards apex.....36
— Inferior appendages, in lateral view, stout, almost obliquely truncate apically (Fig. 75).....*T. allax* sp. nov.
36. Inferior appendages, in lateral view, shorter than spine of mesal basodorsal process; mesal lobe conical (Fig. 77).....*T. fuscinula* sp. nov.

— Inferior appendages, in lateral view, exceeding length of spine of mesal basodorsal process; mesal lobe amost truncate apically (Fig. 73)..... .....*T. cymulosa* sp. nov.

37. Tergum X median lobe simple and undivided distally (Fig. 60)..... .....*T. intricata* Neboiss

— Tergum X median lobe tripartite distally.....38

38. Inferior appendages, in lateral view, truncate apically (Fig. 70)..... .....*T. conjugata* sp. nov.

— Inferior appendages, in lateral view, concave apically (Fig. 64)..... .....*T. perrisotes* sp. nov.

39. Tergum X with a slender, elongate median process on upper part, its apex rounded and setose.....40

— Tergum X upper part a short membranous plate, without a slender median apically setose process, but may have a short bifid process.....45

40. Inferior appendages, in ventral view, with an elongate lateral lobe which gives a pincer-like effect distally (Fig. 123).....*T. melanopeza* sp. nov.

— Inferior appendages, in ventral view, without a distinct lateral lobe.....41

41. Inferior appendages, in lateral view, with height about 1.5 × length, apex produced dorsally to form an irregular-shaped lobe (Fig. 134)..... .....*T. laciniata* sp. nov.

— Inferior appendages, in lateral view, longer than high or about as long as high, without an irregular apical lobe.....42

42. Inferior appendages, in ventral view, rounded basally, apically broadly concave (Fig.131).....*T. doryphora* sp. nov.

— Inferior appendages, in ventral view, fused basally, triangular apically.....43

43. Segment IX, in lateral view, with an extensive triangular membranous area dorsally; tergum X with lower part slender, simple, curved down to project over lower genitalic structures (Fig. 141).....*T. ataloma* sp. nov.

— Segment IX, in lateral view, without an extensive triangular membranous area dorsally; tergum X with lower part stouter and each lobe apically bifid, or slender but only as long as other genitalic parts and upturned.....44

44. Tergum X with each lobe of lower part apically bifid (Fig. 136, 137)..... .....*T. tenerata* sp. nov.

— Tergum X with each lobe of lower part simple, undivided apically (Fig.139) .....*T. empheira* sp. nov.

45. Mesal basodorsal process on inferior appendages expanded irregularly distally but not beak-like or pincer-like apically (Fig.124)...*T. nesiotina* sp. nov.

— Mesal basodorsal process on inferior appendages pincer or beak-like apically 46

46. Mesal basodorsal process on inferior appendages, in ventral view, with a short beak-like apical spine.....47

— Mesal basodorsal process on inferior appendages, in ventral view, excavated to form calliper-like apical structure (Fig.130).....*T. torresiana* sp. nov.

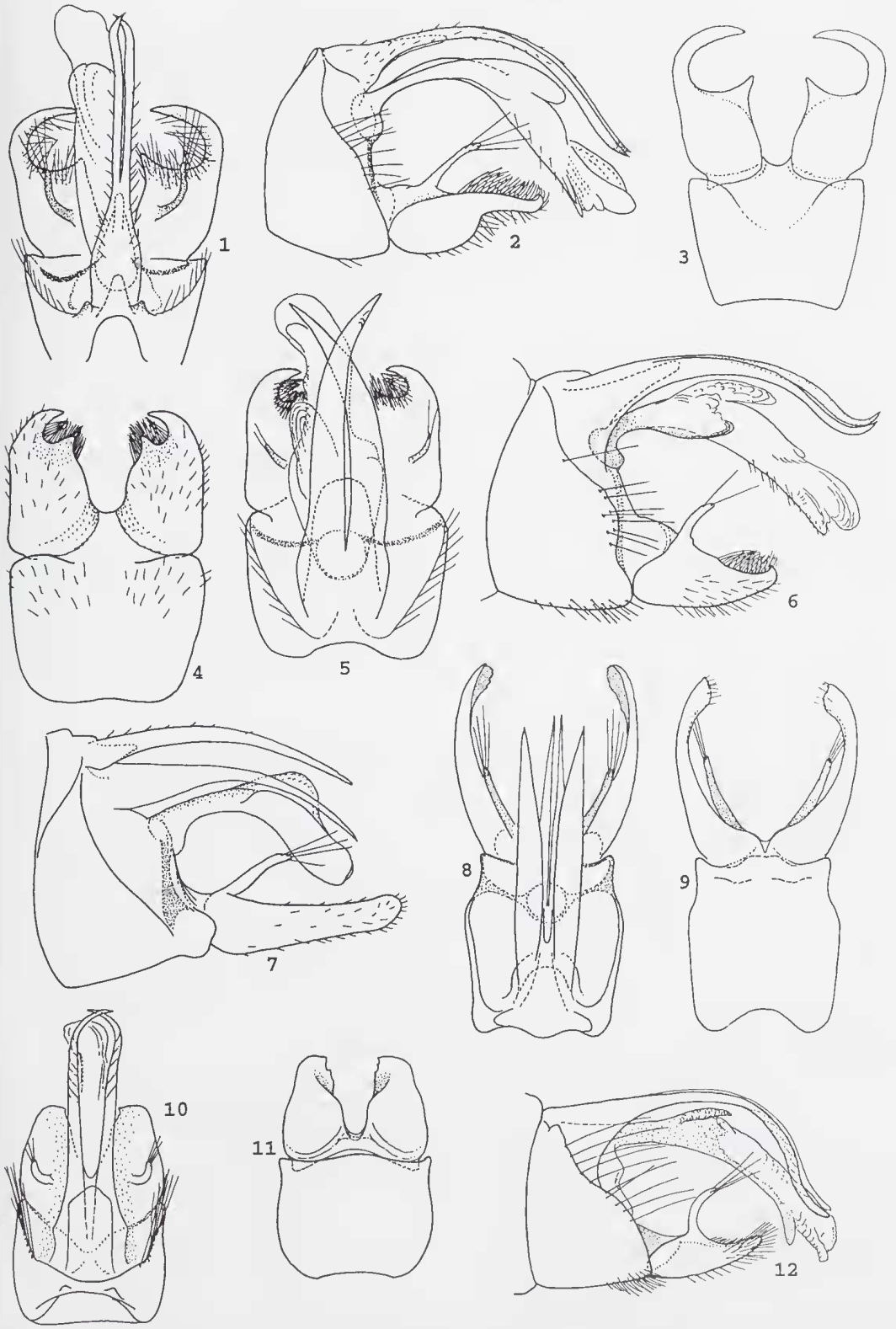
47. Inferior appendages, in ventral view, with a digitiform posteriorly directed lateral process on a rounded basal lobe, dorsally a triangular lobe (Fig.117) .....*T. uvida* sp. nov.

— Inferior appendages, in ventral view, rounded basally, triangular apically, without a lateral lobe (Fig. 120).....*T. nymphaea* sp. nov.

SYSTEMATICS

volda-group

The *volda*-group of four species, including *volda, dysmica, mataranka and jubatus*, is characterised by male genitalia lacking superior appendages; abdominal segment IX triangular in lateral view, very short dorsally; tergum X bipartite, upper part bifid and ventral part simple, short and triangular or longer and bifid; phallus dorsal in position, bulbous basally with sclerotised supporting strips; and inferior appendages with mesal basodorsal processes absent. The male genitalic features of the group are represented in Figs 1–12.



Figures 1–12, male genitalia: 1–3, *Triaenodes volda* Mosely, dorsal, lateral and ventral views; 4–6, *Triaenodes dysmica* sp. nov., ventral, dorsal and lateral views; 7–9, *Triaenodes mataranka* sp. nov., lateral, dorsal and ventral views; 10–12, *Triaenodes jubatus* Neboiss, dorsal, ventral and lateral views.

The group is recorded from southwestern and northwestern Western Australia, northern Northern Territory, along the Great Dividing Range of eastern Australia, and in the south, westwards to central Victoria. This group, apparently unique in the genus in lacking superior appendages, and widespread but not diverse on the Australian continent, may have an earlier origin in Australia than is apparent for other species. The group is not represented in Tasmania, which might be expected for a group with a Gondwanan origin.

Triaenodes volda Mosely

Figures 1–3

Triaenodes volda Mosely, 1953: 276.

Holotype, ♂, Queensland, Eidsvold, BMNH.

Material examined. ♂, SE Queensland, Glastonbury Creek, 15 km W of Gympie, 27 Oct 1980, A.Neboiss, (NMV, genitalic prep. PT-796 illustrated).

Diagnosis. Closely resembling *T. dysmica* but with spines of tergum X slender, lying closely adpressed, apices crossed and with pincer-shape of inferior appendages derived from a deeper, broader subapical concavity.

Description (revised after Mosely, 1953). Length of forewing, ♂ 6.3–7.4 mm, ♀ 5.5–6.4 mm.

Genitalia, male (Figs 1–3). Tergum X with the upper part in the form of a pair of slender closely adpressed spines; the ventral part a simple membranous structure less than half length of upper part. Phallus strongly constricted in lower section but distally expanded and irregular in shape. Inferior appendages in ventral view broad-based, inner margins deeply and roundly excavated subapically; in lateral view rounded basally, narrow in distal half; lateral basodorsal process slender, setose apically.

Remarks. This species is one of the most widespread *Triaenodes* species in Australia. It has been collected from central Victoria through east Gippsland, from Albury on the River Murray to the northeast of New South Wales, from southeastern to northeastern Queensland, and from Cape Crawford in the northeast of the Northern Territory. In the south specimens were collected from October to February (NSW) and March (Vic.), March to April in southern Queensland, December to May in northern Queensland, and one record from the Northern Territory in November.

Triaenodes dysmica sp. nov.

Figures 4–6

Material examined. Holotype, ♂, Western Australia, Ashburton River, Nanatarra Roadhouse, 22°33'S, 115°30'E, 21 Apr 1992, P.J. Gullen and P. Cranston, (ANIC).

Paratypes: ♂, same data as for holotype, (NMV, genitalic prep. PT-2055 illustrated). ♂ Northern Territory, Humbert River 16°26'S, 130°28'E, 8–10 Jul 1966, I. Archibald, (NMV).

Diagnosis. Closely resembling *T. volda* but with upper part of tergum X forming stout spines, and pincer-like tips of inferior appendages produced by a small, relatively shallow subapical concavity on inferior appendages.

Description. Length of forewing, ♂ 6.6 mm.

Genitalia, male (Figs 4–6). Abdominal segment IX subquadrate in ventral view. Segment X comprising a pair of stout elongate spines, crossing subapically and about as long as phallus, lower part a simple short, apically rounded membrane. Phallus strongly constricted in lower section but expanded and elaborated in distal two-thirds. Inferior appendages stout in ventral view, with a concavity on inner subapical margin of apicolateral lobes giving each a pincer-like appearance, a tuft of hair anterodorsally to concavity; in lateral view subtriangular with lateral basodorsal process short, slender, with a pair of apical setae.

Etymology. From the Greek *dysmikos*—western, referring to the western distribution of the *volda-group.*

Remarks. Triaenodes dysmica is known only from a single sample from northwestern Western Australia.

Triaenodes mataranka sp. nov.

Figures 7–9

Material examined. Holotype, ♂, Northern Territory, Roper River, Mataranka homestead, M.S. Moulds, 25 Jan 1977, (NMV, T-16418).

Paratypes: 2♂, same data as for holotype, (NMV, genitalic prep. PT-769 illustrated); ♂, Mataranka, 14 Jul 1969, J. LeSouef, (NMV); ♂, Roper Bar, 15 Jul 1969, J. LeSouef, (NMV).

Diagnosis. Distinguished from other members of the group by the narrow inferior appendages and bifid lower part of tergum X in the male.

Description. Length of forewing, ♂ 5.9–6.8 mm.

Genitalia, male (Figs 7–9). Abdominal segment IX elongate-rectangular in ventral view. Tergum X comprising two almost equal bifid structures, the lower of which appear to rest on grooves on

the phallus. Phallus constricted towards base but expanded in distal half, to form lateral grooves. Inferior appendages in ventral view clasper-shaped, apices slightly expanded; in lateral view rod-shaped, with lateral basodorsal process short with a cluster of setae apically.

Etymology. The name refers to the type locality.

Remarks. This species has been collected only from the Roper River, northeastern Northern Territory.

Triaenodes jubatus Neboiss

Figures 10–12

Triaenodes jubatus Neboiss, 1982: 317–319.

Holotype, ♂, Western Australia, (NMV).

Material examined. Paratype, ♂, WA, Gingin Brook nr Moore River junction, 12 km E of Guilderton, 19 Nov 1978, A. Neboiss, (NMV, genitalic prep. PT-653).

Diagnosis. This species resembles *T. dysmica* sp. nov. and *T. volda* in having stout inferior appendages but differs in lacking a concavity on the inner apical margin of the inferior appendages.

Description (revised after Neboiss, 1982). Length of forewing, ♂ 6–7 mm.

Genitalia, male (Figs 10–12). Abdominal segment IX subquadrate in ventral view. Tergum X comprising an upper pair of elongate spines overlying a short membrane. Phallus elongate, narrow towards base, but expanded and elaborated in distal two-thirds. Inferior appendages broadly lobose in ventral view, tapered to rounded apices in lateral aspect, lateral basodorsal processes slender and short, curved upwards, with a cluster of apical setae.

Remarks. This species is known only from southwestern Western Australia. No futher specimens have been collected since the original description.

theiophora-complex

The two species included in this complex (referred to by Neboiss and Wells (1996) as "group A"), are characterised by male genitalia with superior appendages present; abdominal segment IX very short laterally and dorsally; tergum X a single simple plate; phallus not bulbous basally, with sclerotised supporting strips; and inferior appendages with mesal basodorsal process forming a slender curved spine. The male genitalic features of group are represented in Figs 13–18.

Both species are from northern Australia, one each from Queensland and Western Australia and probably form sister species.

Triaenodes theiophora sp. nov.

Figures 13–15

Material examined. Holotype, ♂, Western Australia, Fine Spring Creek between Lake Argyle village and Duncan Highway, 23 Feb 1977, J.E. Bishop, (NMV, T-16358).

Paratypes: 6 ♂, same data as for holotype, (NMV, genitalic prep. PT-766 illustrated).

Other material. Western Australia: 1♀, Drysdale River, 15°02'S, 126°55'E, 3–8 Aug 1975, I.F.B. Common and M.S. Upton, Drysdale Survey 1975 Site A1, (ANIC); ♂, Carson Escarpment, 14°49'S, 126°49'E, 9–15 Aug 1975, I.F.B. Common and M.S. Upton, Drysdale Survey 1975 Site B1, (ANIC); 1♂, 3♀, Drysdale River, 14°39'S, 126°57'E, 18–21 Aug 1975, I.F.B. Common and M.S. Upton, Drysdale Survey 1975 Site C5, (ANIC).

Northern Territory, 5 ♂, 4♀, Radon Springs, 12°45'S, 132°55'E, 14 Apr 1989, P. Suter and A. Wells, (NMV).

Diagnosis. Triaenodes theiophora is distinguished from *T. toxeres* by the shape of the inferior appendages which in ventral view are constricted on the inner side at about two-thirds their length.

Description. Length of forewing, ♂ 4.1–4.4 mm.

Genitalia, male (Figs 13–15). Abdominal segment IX in ventral view with width exceeding length, laterally expanded medially to form "humps". Segment X in form of a short apically rounded membranous plate. Superior appendages short. Inferior appendages stout and almost skittle-shaped in lateral view, in ventral view abruptly contracted at two-thirds length, mesal basodorsal process in form of fine strongly recurved symmetrical spines. Phallus stout, inserted dorsally, curving downwards.

Etymology. From the Greek *theion*—sulphur, for the yellowish body colour.

Remarks. Triaenodes theiophora is known from localities in the northeast of Western Australia and northern Northern Territory. It is probably widespread across the northwest.

Triaenodes toxeres sp. nov.

Figures 16–18

Material examined. Holotype, ♂, Queensland, Currunda Creek, tributary of Freshwater Creek, Cairns district, 30 Apr 1978, A. Wells, (NMV, T-16602).

Paratypes, N Queensland: 3 ♂, Mt Molloy, 13 Jun 1971, E.F. Riek, (ANIC); ♂, Upper Freshwater Creek, Whitfield Range nr Cairns, 3 Apr 1975, M.S. Moulds,

(NMV, genitalic prep. PT-764 illustrated); 1 ♂, Jardine River, 11°17'S, 142°35'E, 17 Oct 1979, M.S. Moulds, (NMV); 1 ♂, same locality, 27 Oct 1979, M.S. Moulds, (NMV); 5 ♂, 5 km W by N Rounded Hill nr Hope Vale Mission, 15°17'S, 145°10'E, 7 Oct 1980, J.C. Cardale, (ANIC); ♂, Bellenden Ker range, Cable Base Station, 100 m, 17–24 Oct 1981, Earthwatch-Qld Museum expedition,(QM); 2 ♂, McLeod River crossing, W of Mt Carbine, 16°29'S, 144°59'E, 27 Dec 1984, MV light, G. and A. Daniels, (QU); ♂, 9 km ENE Mt Tozer, 12°43' 143°17'E, 5–10 Jul 1986, at light, J.C. Cardale, (ANIC); ♂, Heathlands HS, 15–26 Jan 1992, I. Naumann, (NMV, genitalic prep. PT-2058); 7 ♂, Bertie Creek, 1 km SE Heathlands HS, 4 Feb 1992, D. Cartwright and A. Wells, (QM); 5 ♂, Dulhunty River at telegraph crossing, 11°50'S, 142°30'E, 10 Feb 1992, D. Cartwright and A. Wells, (NMV); 1♂, Heathlands, Bertie Creek, 23 Mar 1993, M. Crossland, (ANIC).

Other material. N Queensland: 3♀, Mossman, 12 Jun 1971, E.F. Riek, (ANIC); 2♀, Mulgrave River W of Gordonvale, 29 Jun 1979, A. Wells, (NMV); 4 ♂, 5 ♀, Moses Creek, 4 km N by E Mt Finnegan, 15°47'S, 145°17'E, 14–16 Oct 1980, J.C. Cardale, (ANIC); 2 ♂ 1 ♀, 11 km W by N Bald Hill, McIlwraith Range, 520 m, 27 Jun 1989, I. Naumann, (ANIC); 1 ♂, 1♀, Gunshot Creek at Telegraph crossing, 11°44'S, 142°29'E, 16 Feb 1992, D. Cartwright and A. Wells, (NMV); 2 ♂, 4♀, same locality and collectors, 17 Feb 1992, (NMV); 2 ♂, Bridges Creek, 11°13'S, 142°33'E, 19 Nov 1992, P. Zborowski and A.A. Calder, (ANIC).

Diagnosis. This species most closely resembles *T. theiophora*, particularly in the form of tergum X, but is distinguished from that species by the more gradual tapering of the inferior appendages in ventral aspect.

Description. Length of forewing, ♂ 4.6–5.2 mm.

Genitalia, male (Figs 16–18). Abdominal segment IX quadrate in ventral view. Tergum X comprising a short tapered plate with its apex apically concave. Superior appendages short, rather stout. Inferior appendages clasper-like in ventral view, mesal basodorsal process forming a fine strongly recurved spine. Phallus stout, curving downwards, with dorsal furrows.

Etymology. From the Greek toxeres—meaning furnished with a bow, in reference to the shape of the male genitalia.

Remarks. This is a widespread and commonly collected species in northeastern Queensland. Collecting dates suggest a lack of seasonality in adult emergence times.

copelata complex

The *copelata*-complex of some eight species—*copelata*, *virgula*, *gibberosa*, *barbarae*, *camura*, *rutella*, *etheira*, *stipulosa* (referred to by Neboiss and Wells (1996) as "group B"), is characterised by presence of superior appendages; abdominal segment IX more or less rectangular in lateral view, with the apicodorsal angle rounded and a relatively narrow excavation middorsal; tergum X comprising usually a simple plate; phallus dorsal in position, mesal and lateral basodorsal processes slender, setose apically. The male genitalic features are illustrated in Figs 19–47.

All members of this complex are northern in distribution.

Triaenodes copelata sp. nov.

Figures 19–21

Material examined. Holotype, ♂, Northern Territory, Radon Springs, 12°45'S, 132°55'E, 13–14 Jun 1988, P. Suter and A. Wells, (NMV, T-16301).

Paratypes: 2 ♂, same data as for holotype, (NMV, genitalic prep. PT-2053 illustrated); 3♂, same locality and collectors, 14 Jun 1988, 1 h before dawn, Lt Tr., (NMV); 3 ♂, same locality, 13 Jun 1989, Lt Tr., P. Suter and A. Wells, (NMV).

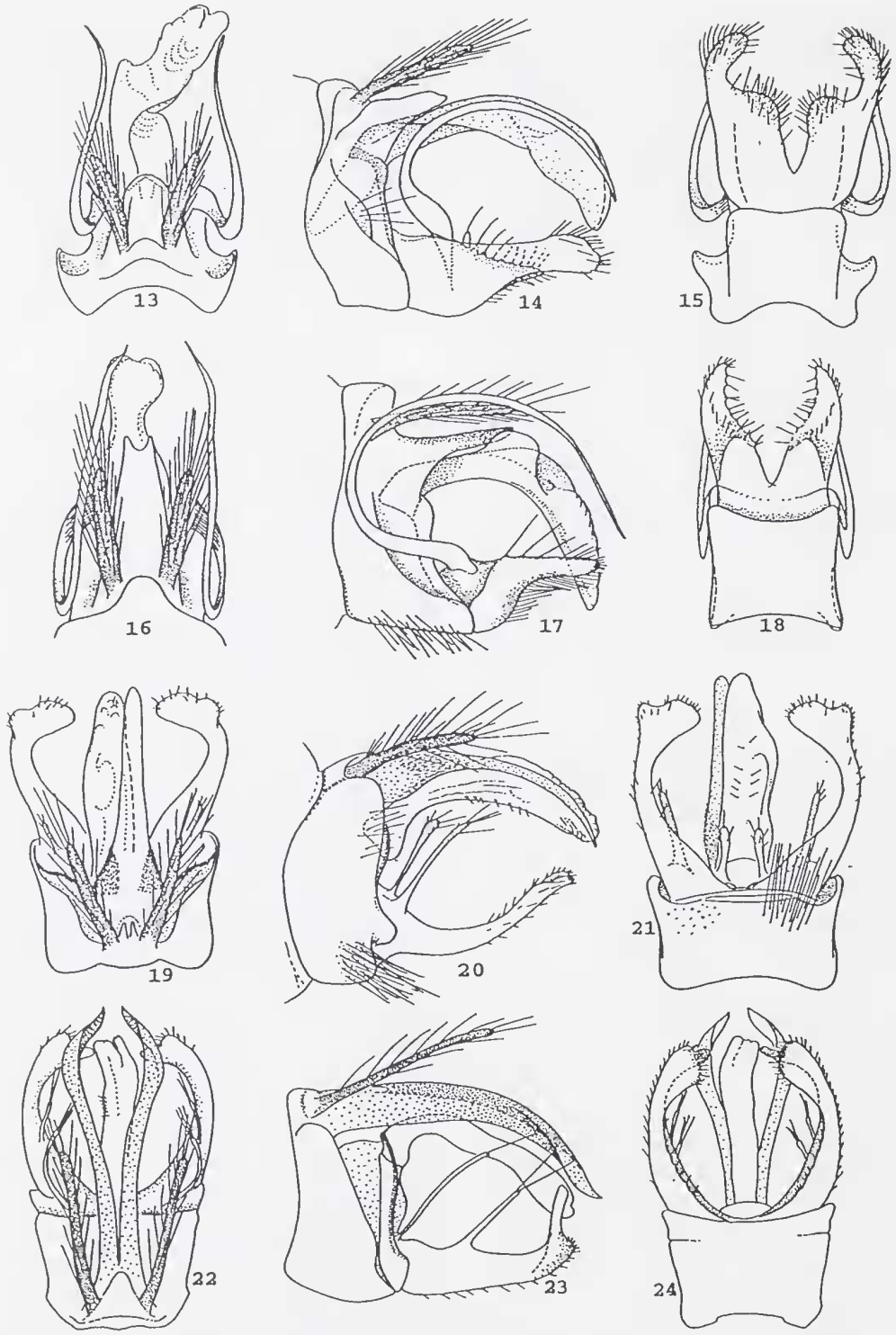
Diagnosis. In basic form of male inferior appendages, this species most closley resembles T. virgula, however the inferior appendages are expanded distally in a distinctive way, lack a terminal digitiform process and tergum X is a simple undivided plate.

Description. Length of forewing, ♂ 5.0–5.7 mm.

Genitalia, male (Figs 19–21). Tergum X an elongate, tapered plate with spinules basolaterally and a pair of small triangular structures between the bases of the superior appendages. Superior appendages about half length of tergum X. Phallus constricted slightly in lower third, with 2 rows of setae ventrally on distal third. Inferior appendages in ventral view clasper-shaped with apices expanded; in lateral view narrow, upturned, lateral basodorsal process slender, elongate with a cluster of short setae apically, mesal basodorsal process slightly shorter, setate apically.

Etymology. From the Greek *kopelatos*—oar-like in reference to the shape of the inferior appendages.

Remarks. Triaenodes copelata is known only from the type locality in Kakadu National Park, Northern Territory. This particular locality, a small springfed steam originating in the strata of an outlier of the Arnhem escarpment, appears to support a relictual fauna, its members having close sister taxa in the northeast of Queensland.



Figures 13–24, male genitalia: 13–15, *Triaenodes theiophora* sp. nov., dorsal, lateral and ventral views; 16–18, *Triaenodes toxeres* sp. nov., dorsal, lateral and ventral views; 19–21, *Triaenodes copelata* sp. nov., dorsal, lateral and ventral views; 22–24, *Triaenodes virgula* sp. nov., dorsal, lateral and ventral views.

Triaenodes virgula sp. nov.

Figures 22–24

Material examined. Holotype, ♂, NW Western Australia, Mitchell Plateau, Camp Creek, Crusher site, 20 Jul 1978, P. Suter, (NMV, T-16372).

Paratypes, NW Western Australia: ♂, same loc. and collector as holotype, 13 Jul 1978, (NMV); ♂, same loc. and collector as holotype, 21 Jul 1978, (NMV genitalic prep. PT-775 illustrated); 13 ♂, Drysdale River, 15°02'S, 126°55'E, 3–8 Aug 1975, I.F.B. Common and M.S. Upton, Drysdale Survey Site A1, (ANIC); 2 ♂, Carson Escarpment, 14°49'S, 126°49'E, 9–15 Aug 1975, I.F.B. Common and M.S. Upton, Drysdale Survey Site B1, (ANIC); ♂, Barnett River Gorge, Barnett Station, Kimberley, 1 Oct 1979, J. Blyth, (NMV); 2 ♂, Drysdale River headwaters, 30 km NW of Mt Elizabeth Homestead, 30 Sep 1979, J. Blyth, (NMV); 4 ♂, 16°31'S, 126°16'E, CALM site 25/1, Synnot Creek, 17–20 Jun 1988, T.A. Weir, (ANIC).

Other material. NW Western Australia: ♂, Fern Creek nr Mt Bell, King Leopold Range, 17°10'S, 125°17'E, 10 Apr 1988, T.F. Houston, (WAM).

Northern Territory: ♂, Alligator Rivers Region, Stag Creek at BHP camp, MV-lt, 25 May 1988, P. Suter and A. Wells, (NMV).

Diagnosis. In general form of abdominal segment IX, and processes on inferior appendages, most closely resembling *T. barbarae*, however the inferior appendages are simpler, without the inner dorsal pincer-like structures and the apices of the inferior appendage are produced dorsally in a small digitiform process.

Description. Length of forewing, ♂ 5.7–6.4 mm.

Genitalia, male (Figs 22–24). Abdominal segment IX short, subtriangular in lateral view. Segment X comprising a pair of long, spines which curve outwards distally, then converge apically. Superior appendages slender, elongate. Inferior appendages clasper-shaped in ventral view, in lateral view with an upturned digitiform apical process; lateral and mesal basodorsal processes in lateral view forming straight filaments with two and one apical setae respectively. Phallus elongate, slender, down-turned from close to base.

Etymology. The Latin *virgula* (dim.)—branch, twig, in reference to two thin processes on inferior appendages.

Remarks. This appears to be a common species in northwestern Western Australia, possibly multivoltine as it has been collected in a scattering of months throughout the year.

Triaenodes barbarae sp. nov.

Figures 25–27

Material examined. Holotype, ♂, Western Australia, Millstream, Fortescue River S of Roeburne, 22 Feb 1977, M.S. and B.J. Moulds, (NMV, T-16312).

Paratypes, Western Australia: 2 ♂, same data as for holotype, (NMV, genitalic prep. PT-778 illustrated); ♂, same locality and collectors, 12 Nov 1978, (NMV); 3 ♂, Millstream Crossing Pool, 21 Oct 1970, J.C. Cardale, (ANIC); ♂, Millstream, 25 Oct 1970, J.C. Cardale, (ANIC); 5 ♂, Millstream HS, 21°37'S, 117°06'E, 2 Apr 1971, E.F. Riek, (ANIC, NMV); 3 ♂, Fortescue Falls, Hammersley Range National Park, 27 Oct 1979, J. Blyth, (NMV); ♂, Nanatarra Roadhouse, Ashburton River, 22°33'S, 115°30'E, 21 Apr 1992, P.J. Gullen and P.S. Cranston, (NMV); ♂, Millstream National Park, Deep Reach, 21°37'S, 117°04'E, 24 Jun 1992, P.S. Cranston, (ANIC); ♂, Millstream National Park, Fortescue River, 24 Jun 1992, P.S. Cranston, (ANIC).

Diagnosis. This species is distinguised from others in the group by the mesodorsal elaborations on the inferior appendages and by having a slender mesal filament dorsally on tergum X.

Description. Length of forewing, ♂ 5.7–6.9 mm.

Genitalia, male (Figs 25–27). Abdominal segment IX short, not strongly excised dorsally. Tergum X an elongate triangular plate with a slender, straight median process dorsally. Superior appendages slender, about half length of tergum X. Inferior appendages cylindrical with pincer-shaped process dorsomesally at about two-thirds length in ventral view; in lateral view lateral mesodorsal process short with paired apical setae, mesal laterodorsal process filamentous, curved, bearing a single apical seta.

Etymology. Named for Mrs Barbara Moulds, in recognition of her contribution to collections of Australian Trichoptera.

Remarks. This species is known only from the Millstream area of Western Australia. Like Radon Springs in Kakadu National Park, Northern Territory, fresh waters of the Millstream area of Western Australia appear to support a relictual fauna with close associations with the fauna of northern Queensland.

Triaenodes gibberosa sp. nov.

Figures 28–30

Material examined. Holotype, ♂, NW Western Australia, Barnett River Gorge, Barnett Station, 16°38'S, 126°00'E, 1 Oct 1979, J. Blyth, (NMV, T-16378).

Paratypes, NW Western Australia: ♂, same data as for holotype, (NMV, genitalic prep. PT-776 illustrated); 5 ♂, Drysdale River, 3–8 Aug 1975, I.F.B. Common and M.S. Upton, Drysdale River Survey Site A1, (ANIC); 2 ♂, Morgan River, Theda homestead, 14°48'S, 126°30'E, 28 Sep 1979, J.Blyth, (NMV); ♂, Mitchell Plateau, Lone Pine Creek tributary of Mitchell River, 17 Feb 1979, J.E. Bishop, (NMV); ♂, Mitchell Plateau, Camp Creek, at lt, 19 Feb 1979, J.E. Bishop,

(NMV); 2 ♂, same locality and collector, 31 Jan 1978, (NMV); ♂, same locality and collector, 15 Feb 1979, (NMV); ♂, Drysdale River at Kalumburu Road Crossing, 15°41'S, 126°23'E, 28 Sep 1979, J. Blyth, (NMV); 3 ♂, Mitchell Plateau, Mining Camp, 14°49'S, 125°50'E, 9–19 May 1983, J.C. Cardale, (ANIC); 1 ♂, 15°36'S, 125°15'E, CALM Site 28/3, 4 km W of King Cascade, 12–16 Jun 1988, T.A. Weir, (ANIC); 10 ♂, Charnley River 2 km SW of Rolly Hill, 16°22'S, 125°12'E, CALM Site 25/2, 16–20 Jun 1988, I.D. Naumann, (ANIC, NMV).

Other material. NW Western Australia: ♂, Fine Spring Creek between Lake Argyle Village and Duncan Highway, 23 Feb 1977, J.E. Bishop, (NMV); 4 ♂, Fine Spring Creek between Lake Argyle Village and Duncan Highway, 2 Feb 1978, J.E. Bishop, (NMV).

Northern Territory: 2 ♂, South Alligator River, UDP Falls, 7 Sep 1970, J. Blyth, (NMV); male, Graveside Creek, 18 Jun 1988, P. Dostine, (NTM); ♂, Stag Creek at BHP camp, 25 May 1988, Lt Tr., P. Suter and A. Wells, (NMV); m, Bowerbird Billabong outlet, 1 Oct 1988, P. Dostine, (NMV).

Diagnosis. In general appearance this species appears quite distinct, but interpretation of homologies in genitalic parts suggests that it aligns most closely with *T. stipulosa* and *T. etheira*. In common with these species the superior appendages are short and tergum X comprises a membranous plate which may be bifid distally, but *T. gibberosa* is distinguished by its broad inferior appendages with irregular-shaped upturned apices and additional strap-like process on the inner side.

Description. Length of forewing, ♂ 5.4–6.8 mm.

Genitalic structures (Figs 28–30), generally short relative to most other species. Abdominal segment IX reduced to a narrow band ventrally. Segment X comprising a short membranous plate. Superior appendages very short, less than half length of tergum X. Inferior appendages are difficult to interpret: each is a broad plate in ventral view, in lateral view with an apical dorsally directed process; arising basomesally a curved, dorsally-directed strap; lateral basodorsal process elongate and stouter than the filamentous mesal basodorsal process. Phallus short, downturned.

Etymology. From the Latin *gibber*—humped, in reference to the elevated hump of segment X.

Remarks. This species has been collected commonly in the northwest of Western Australia and rather rarely from the Alligator Rivers region of the northern Northern Territory.

Triaenodes stipulosa sp. nov.

Figures 31–35

Material examined. Holotype, ♂, SE Queensland, Glastonbury Creek, 15 km W of Gympie, 27 Oct 1980, A. Neboiss, (NMV, T-16559).

Paratypes, Queensland: 4 ♂, Yabba Creek, 10 km W of Imbil, 26 Oct 1980, A. Neboiss, (NMV, genitalic prep. PT-782 illustrated); ♂, Obi Obi Creek, 8 km SW of Mapleton, 23 Oct 1980, A. Neboiss, (NMV); ♂, Camp Mountain, 31 Mar 1967, N. Dobrotworsky, (NMV); 2 ♂, Teviot Brook nr Wilsons Peak, 17–18 Nov 1980, M. Schneider and C. Daniels, (QM); ♂, Cooloola National Park, Noosa River, 28–29 Nov 1985, D. Bickle and G. Cassis, (NMV). North Queensland: 4 ♂, Alice River, Hervey River Road, 25 km W Townsville, 9 May 1979, A. Wells, (NMV); 3 ♂, Crystal Creek, Mt Spec turnoff, 2 May 1979, A. Wells, (NMV); ♂, Mulgrave River nr Gordonvale, 24 Mar 1992, G. Theischinger, (NMV); ♂, Mulgrave River, 8 km NW of Gordonvale, 15 Sep 1988, K. Walker, (NMV); ♂, Currunda Creek trib. of Freshwater Creek, Cairns District, 30 Apr 1979, A. Wells, (NMV); 2 ♂, 16 km W of Ravenshoe, 2 Jan 1975, M.S. Moulds, (NMV); 2 ♂, Annan River, 3 km W by S Black Mtn, 27 Sep 1980, J.C. Cardale, (ANIC); 2 ♂, Hann River, 73 km NW by W Laura, 27 Jun 1986, J.C. Cardale, (ANIC); ♂, Gunshot Creek, Telegraph Crossing, 10 Apr 1992, M. Crossland, (ANIC); 2 ♂, Cockatoo Creek crossing, 17 km NW Heathlands, 15–26 Jan 1992, T. Weir, (ANIC); ♂, Jardine River, Cape York Peninsula, 14 Oct 1979, M.S. Moulds, (NMV); ♂, same loc. 19 Oct 1992, P. Zborowski and T. Weir, (ANIC).

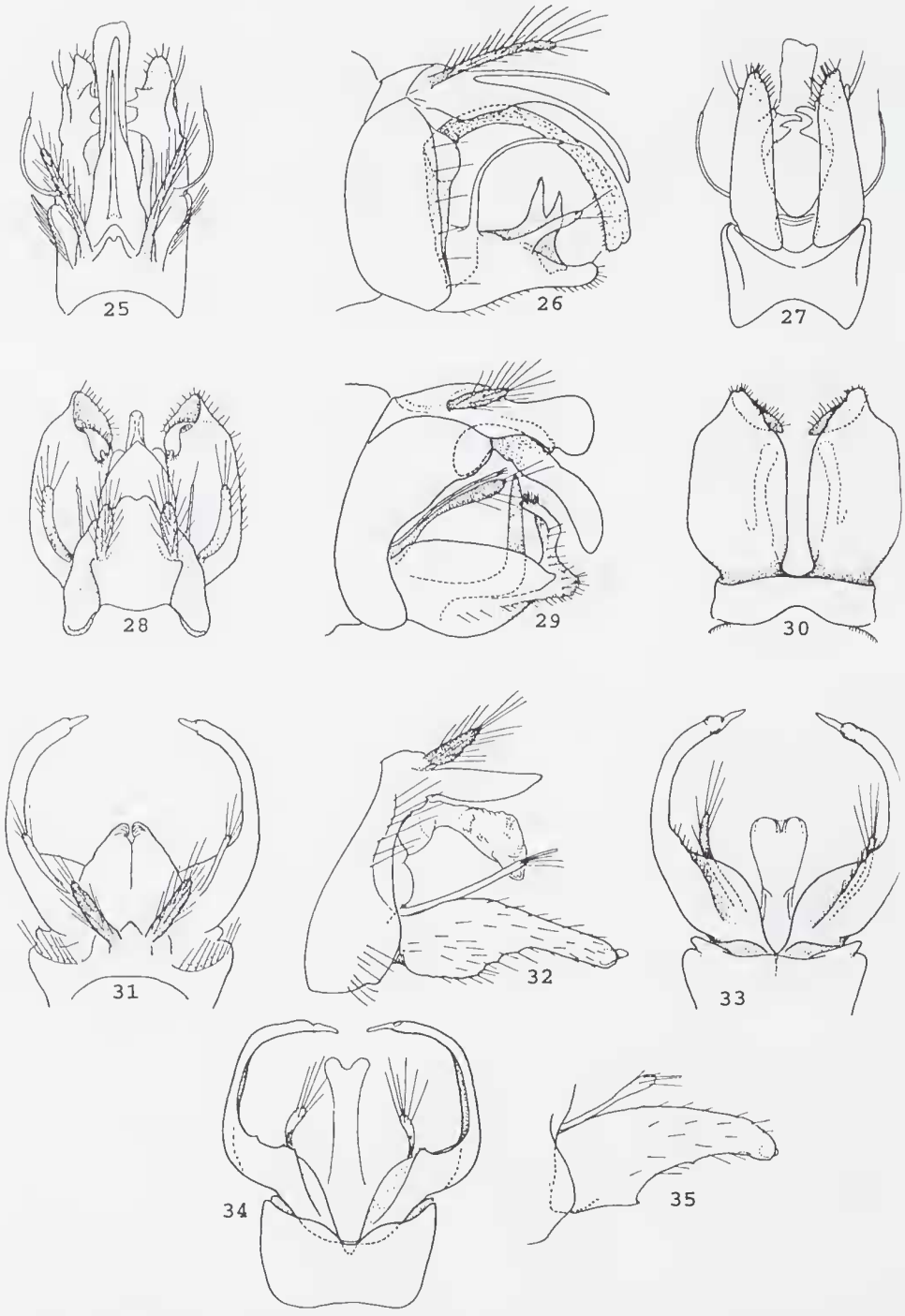
Other material. Western Australia: ♂, 12 km S of Kalumburu Mission, 14°25'S, 126°38'E CALM site 13/4, 7–11 Jun 1988, T.A. Weir, (ANIC), ♂, Ord River, 9 km N Kununurra, 19 Sep 1979, J. Blyth, (NMV).

Northern Territory: 2 ♂, Howard Creek, 3 km E of Howard Springs, 17 Aug 1979, J. Blyth, (NMV, genitalic prep. PT-784); 20 ♂, Holmes Jungle, 7 Apr 1991, Wells and Horak, (NMV); 4 ♂, McArthur River nr Cape Crawford, 25 Oct 1975, J.C. Cardale, (ANIC); ♂, Adelaide River, 15 km E of Stuart H-way, 15 Aug 1979, J. Blyth, (NMV). NE Queensland: ♂, Cockatoo Creek crossing, 17 km NW Heathlands HS, 11°39'S, 142°27'E, 22 Mar 1992, T.M. McLeod, (ANIC).

New South Wales: ♂, Clarence River at Yates Crossing, 26 Oct 1981, A. Wells and D. Carter, (NMV).

Diagnosis. In general form of male genitalia this species resembles *T. virgula* and *T. copelata*, from which it differs in having tergum X short, slightly divided distally and in lateral view, slender inferior appendages without the lateral basodorsal process.

Description. Length of forewing, ♂ 6.1–7.3 mm.



Figures 25–35, male genitalia: 25–27, *Triaenodes barbarae* sp. nov., dorsal, lateral and ventral views; 28–30, *Triaenodes gibberosa* sp. nov., dorsal, lateral and ventral views; 31–33, *Triaenodes stipulosa* sp. nov. (Yabba Creek, NE Qld), dorsal, lateral and ventral views; 34, 35, *Triaenodes stipulosa* sp. nov. (Howard Springs, NT), ventral view and inferior appendage, lateral view.

Genitalia, male (Figs 31–35). Abdominal segment IX reduced to a narrow band, width greatly exceeding length, posterolateral angles slightly produced. Segment X comprising a membranous plate, about half length of inferior appendages, broad mesally, tapered in distal half and cleft apically. Superior appendages narrow, about half length of tergum X. Inferior appendages clasper-shaped in ventral view, broad basally, slender in distal part, with a digitiform process apically; in lateral view skittle-shaped; lateral basodorsal process absent; mesal basodorsal process a single slender filament with a cluster of setae apically. Phallus arched, narrow proximally, slightly expanded distally.

Etymology. From the Latin, *stipes*—branch, in reference to the process arising at the base of the inferior appendage.

Remarks. Triaenodes stipulosa is widespread across northern Australia and down the Eastern Divide to northern New South Wales. At least in the Northern Territory it appears to be restricted to the slower low gradient, macrophyte rich silt-based streams. Males show considerable variation in genitalic form across the range, with the inferior appendages in ventral view being narrower in distal part and having a small angular projection posteroventrally at about one third distance from base (see Figs 34, 35).

Triaenodes etheira sp. nov.

Figures 36–41

Material examined. Holotype, ♂, Western Australia, Ord River, Kunnanurra Dam, 21 Feb 1977, J.E. Bishop, (NMV, T-16243).

Paratypes, Western Australia: 2 ♂, collected with holotype, (NMV, genitalic prep. PT-779 illustrated); 14 ♂, Drysdale River, 15°02'S, 126°55'E, 3–8 Aug 1975, I.F.B. Common and M.S. Upton, (ANIC, NMV, genitalic prep. PT-780, PT-781 for right side inferior appendage as illustrated); ♂, stream opposite Dead Horse Gap, Lake Argyle, 19 Feb 1977, J.E. Bishop, (NMV); ♂, the Crusher, 4 km S by W Mining camp, Mitchell Plateau, 2–6 Jun 1988, I.D. Naumann, (ANIC).

Northern Territory: ♂, McArthur River, 14 km S by W of Cape Crawford, 25 Oct 1975, J.C. Cardale, (ANIC); 3 ♂, Bessie Springs, 8 km ESE of Cape Crawford, 26 Oct 1975, J.C. Cardale, (ANIC, NMV); ♂, Limestone Gorge, 16°02'S, 130°23'E, 22 June–3 Aug 1986, M. Malipatil, (NMV); 7 ♂, Bullita outstation, 16°07'S, 130°25'E, 22 June–3 Aug 1986, MV light, M. Malipatil, (NTM, NMV); 2 ♂, South Alligator River, 23 Aug 1988, P. Dostine (NTM, NMV); m, same loc., Oct. 1988, P. Dostine, (NTM).

Diagnosis. In basic form of inferior appendages and tergum X this species appears most closely alligned with T. stipulosa. The form of the right inferior appendage resembles that of some of the more extreme forms of stipulosa, and the form of tergum X of both species is similar. However, T. *etheira* resembles *T. rutella* in having quite asymmetric inferior appendages. In this species the right inferior appendage has a stout, dorsally directed spine on the inner side near the base.

Description. Length of forewing, ♂ 5.7–6.7 mm.

Genitalia, male (Figs 36–41), with genitalic parts generally short compared to the width of the abdomen relative to most other Australian species. Abdominal segment IX with width greater than length. Tergum X comprising a membranous plate which is tapered distally and cleft apicomesally. Superior appendages slender, short, about two-thirds length of tergum X. Inferior appendages basically clasper-shaped, asymmetrical, left with a well-developed basodorsal spine which could be homologous with the lateral basodorsal process; on right in position of spine a variable-sized somewhat angular expansion on the dorsal surface; mesal basodorsal process dilated basally, with several apical setae. Phallus narrow proximally, greatly distended and downwturned in distal two-thirds.

Remarks. The shape of the right inferior appendage is variable (see Figs 39, 40, 41), sometimes appearing to retain vestiges of a spine to match that on the left side.

Etymology. The Latin *etheira*—mane or crest, in reference to the long hair tufts on the scape.

Remarks. Collected in the Ord River region of northwestern Western Australia and in the north of the Northern Territory, *T. etheira* may be more widespread across the north.

Triaenodes camura sp. nov.

Figures 42–44

Material examined. Holotype, ♂, Northern Territory, Devil Devil Creek, 70 km SW Daly River Mission, 23 Aug 1979, J. Blyth, (NMV, T-16486).

Paratypes, Northern Territory: ♂, same data as for holotype, (NMV, genitalic prep. PT-774 illustrated); 4 ♂, Muriella Park, 12 Oct 1971, E.F. Reik, (ANIC); 2 ♂, Cooper Creek, 19 km E by S Mt Borradaile, 9–10 Nov 1972, J.C. Cardale, (ANIC); ♂, Magela Creek, 2 km N Mudginberry Homestead, 14 Nov 1972, J.C. Cardale, (ANIC); 2 ♂, Nourlangie Creek, 6 km E Mt Cahill, 18 Nov 1972, J.C. Cardale, (ANIC); 7 ♂, same loc., 14–15 Jun 1973, J.C. Cardale; 2 ♂, Jim Jim Creek, 19 km WSW Mt Cahill, 17 Jun 1973, J.C. Cardale, (ANIC); 3 ♂, Katherine Gorge Nat. Park, 13 Aug 1979, J. Blyth,

(NMV); ♂, Jim Jim Waterhole, Kakadu National Park, 5 Sep 1979, J. Blyth, (NMV); 5 ♂, South Alligator River, UDP Falls, 7 Sep 1979, J. Blyth, (NMV); ♂, same loc., 18–19 Jul 1980, MV Lt, M. Malipatil, (NTM); 6 ♂, Magela Creek, 12 km N Arnhem Hwy on Oenpelli Road, 26 Mar 1980, M. Malipatil, (NTM, NMV); ♂, Graveside Gorge, 18 Jul 1988, P. Dostine, (NMV); ♂, Kambolgie Creek, 25 May 1988, P. Suter and A. Wells, (NTM); 2 ♂, South Alligator River, 23 Aug 1988, P. Dostine, (NMV); ♂, South Alligator River, Oct 1988, Lt tr., P. Dostine, (NTM); 2 ♂, Gulungul Creek at inlet to Billabong, 12°38'S, 132°53'E, 20 Apr 1989, A. Wells and P. Suter, (NMV).

Diagnosis. In form of male inferior appendages this species stands apart. The inferior appendages are symmetrical, each bearing subapically a broad, dorsally curving strap.

Description. Length of forewing, 6.1–6.9 mm.

Genitalia, male (Figs 42–44). Abdominal segment IX deepest ventrally, almost completely reduced dorsally. Tergum X comprising a pair of spine-like lobes which are slightly convergent distally. Superior appendages slender, about half length of tergum X. Inferior appendages symmetrical, narrow in lateral view; a strap-like process arising at about two-thirds length and twisting dorsally; lateral basodorsal process absent; mesal basodorsal process a single upwardly curved lobe, with sparse setae apically. Phallus narrow proximally, stouter in distal half, apically acute.

Etymology. From the Latin *camur*—turned inwards, crooked, in reference to the processes on the inferior appendages.

Remarks. This species is known only from the "Top End" of the Northern Territory. It is common in the Alligator Rivers Region where mass emergences appear to occur. Occasionally large numbers of individuals have been seen sitting on foliage of low riparian vegetation during the day.

Triaenodes rutella sp. nov.

Figures 45–47

Material examined. Holotype, ♂, Western Australia, Morgan River, Theda HS, Kimberley, 14°48'S, 126°43'E, 28 Sep 1979, J. Blyth, (NMV, T-16335).

Paratypes, Western Australia: 2 ♂, same data as for holotype, (NMV, genitalic prep. PT-770 illustrated); ♂, Charnley River, CALM site 25/2, 2 km SW Rolly Hill, 16°22'S, 125°12'E, 16–20 Jun 1988, I.D. Naumann, (ANIC).

Diagnosis. Triaenodes rutella is distinguished in the complex by the unequal but paired processes that arise dorsally on the inferior appendages. These are probably homologous with the straplike structures in *T. camura* from which this species also differs in having a simple undivided dorsal plate.

Description. Length of forewing, ♂ 5.6–5.7 mm.

Genitalia, male (Figs 45–47). Abdominal segment IX reduced to a narrow band with width greatly exceeding length, deeply excavated midventrally. Segment X a membranous plate, subapically expanded laterally, rounded apically in ventral view, acute in lateral view. Superior appendages slender, about two-thirds length of plate of tergum X. Inferior appendages in lateral view almost straight, narrow, on left a long slender curving strap-like process arises at about midway and twists dorsally, the right homologue is short and stouter, also twisted (these may have derived from the pincer-shaped process of *T. barbarae* and are surely homologous with the strap-like processes of *T. camura*); lateral basodorsal process absent, mesal basodorsal process slender, short, with a single apical seta. Phallus narrow, slightly curved.

Etymology. The Latin *rutella*—small shovel, in reference to the shape of segment X.

Remarks. Triaenodes rutella is known only from northwestern Western Australia.

celata complex

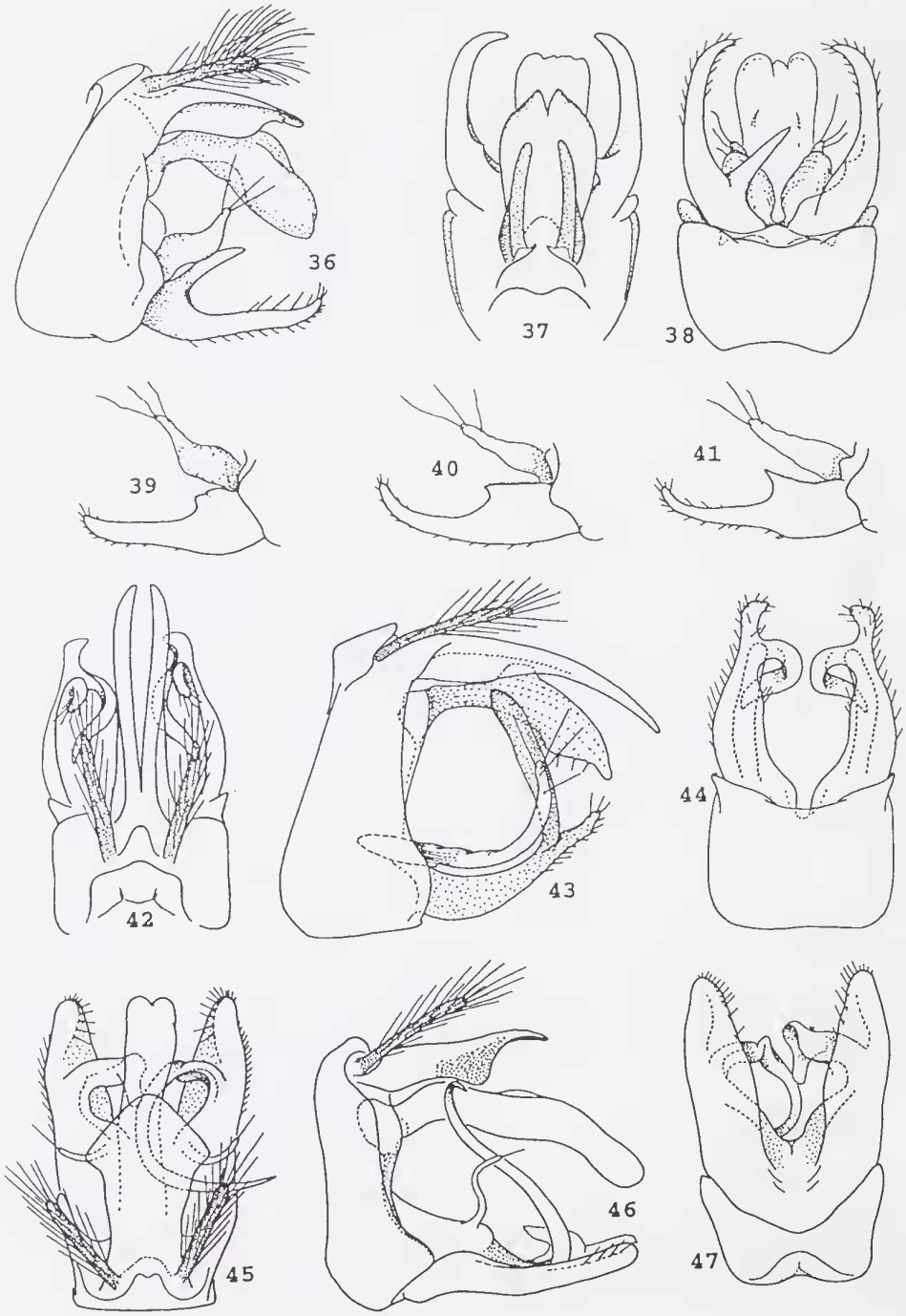
A set of four Australian species, here designated the celata complex (referred to by Neboiss and Wells (1996) as "group C") and including *Triaenodes celata* as well as *T. drepana* sp. nov., *dibolia* sp. nov., and *reclusa* sp. nov., all have the unusual feature of a suture completely dividing the IXth abdominal segment but more ventrally placed than the usual midlateral position of the separation of tergum and sternum. In this complex (see Figs 48–59) superior appendages are present; tergum X is a simple membranous plate; the inferior appendages lack the mesal basodorsal process, having only a slender apically setose lateral basodorsal process; and the phallus is not bulbous basally, lacks supporting strips and is positioned dorsally.

Species with this curious suture on abdominal segment IX appear to occur only in the north of Australia. No similar species are known at present from New Guinea or Indonesia.

Triaenodes celata sp. nov.

Figures 48–50

Material examined. Holotype, ♂, N Queensland, Alice River nr Townsville, 11 Apr 1979. A. Wells, (NMV, T-16431).



Figures 36–47, male genitalia: 36–41, *Triaenodes etheira* sp. nov., lateral, dorsal and ventral views, right inferior appendages of (39) PT-779 – Howard Springs, NT, (40) PT-780 and (41) PT-781 – Drysdale River, NT; 42–44, *Triaenodes camura* sp. nov., dorsal, lateral and ventral views; 45–47, *Triaenodes rutella* sp. nov., dorsal, lateral and ventral views.

Paratypes, N Queensland: 3 ♂, same data as for holotype, (NMV, genitalic prep. PT-801 illustrated); ♂, 16 km S of Coen, 29 Nov 1974, M.S. Moulds, (NMV); ♂, Lockerbie Scrub, Cape York Peninsula, 15 Jun 1975, M.S. Moulds, (NMV); ♂, Hervey Range, Two Mile Creek, 16 Apr 1979, A. Wells, (NMV); ♂, Stoney Creek on Mt Stuart Road nr Townsville, 27 Apr 1979, A. Wells, (NMV); ♂, Bertie Creek, 1 km SE of Heathlands Homestead, 4 Feb 1992, D. Cartwright and A. Wells, (NMV); 2 ♂, Cape York Peninsula, Tributary Bertie Creek, 2.5 km SW of Heathlands, 11 Feb 1992, D. Cartwright and A. Wells, (NMV); 26 ♂, Cape York Peninsula, Heathlands Homestead, Bertie Creek, 23 Mar 1993, M. Crossland, (ANIC, NMV).

Other material. N Queensland: 2 ♂, Iron Range, 27.vi–4 May 1973, S.R. Monteith, (ANIC); ♂, same loc., 5 Jan 1974, S. McEvey, (NMV); ♂, same loc., 5 May 1975, M.S. Moulds, (NMV); 10 ♂, Lockerby area, Cape York Peninsula, 13–27 Jun 1973, S.R. Monteith, (ANIC); ♂, Kalpower Crossing, NE of Laura, 2 Jun 1983, Storey and Brown, (NMV); ♂, 5 km WNW Captain Billy Landing, monsoon forest, 2 Apr 1993, P. Zborowski, (ANIC).

Diagnosis. Males of *Triaenodes celata* resemble those of *T. dibolia* sp. nov. and *T. drepana* sp. nov., but differ from both in having the apices of the inferior appendages rounded, a feature shared with *T. reclusa* sp. nov. They also differ from males of the latter species in that tergum X is undivided.

Description. Length of forewing, ♂ 5.0–5.8 mm.

Male genitalic structures (Figs 48–50) relatively simple. Abdominal segment IX with sternite heart-shaped in ventral view. Segment X in form of a simple membranous plate, slightly concave apically. Superior appendages short, about two-thirds length of tergum X. Inferior appendages clasper-shaped in ventral view, lateral mesodorsal process filiform, setate distally. Phallus in lateral view shaped rather like an inverted foot, being narrow anteriorly, swollen and down-turned in distal half.

Etymology. From the Latin *celo* (-atus)—hide, conceal, in reference to the pale cover on the antennal scape scent organ.

Remarks. Triaenodes celata is common in north-eastern Queensland.

Triaenodes dibolia sp. nov.

Figures 51–53

Material examined. Holotype, ♂, NW Western Australia, Mitchell Plateau, Camp Creek, 31 Jan 1978, J.E. Bishop, (NMV, T-16426).

Paratypes, NW Western Australia: ♂, same data as for holotype, (NMV, genitalic prep. PT-768 illustrated); ♂, Mitchell Plateau, Mining Camp, 14°49'S, 125°50'E, 9–19 May 1983, J.C. Cardale, (ANIC). Northern Territory: 2♂, Goanna Lagoon, 1 km W of Jabiru off Arnhem Highway, 27 Feb 1979, R. Marchant, (NMV); ♂, Darwin, 1 Jun 1980, M. Malipatil, (NTM); ♂, Town Lake, Jabiru, 16 Feb 1991, MV-lt, A. Wells and C. Humphrey, (NMV).

Diagnosis. This species most closely resembles *T. celata* and *T. drepana* sp. nov. in general form of male genitalic structures, but is distinguished by having inferior appendages lanceolate and almost straight in lateral view.

Description. Length of forewing, ♂ 5.1–5.3 mm.

Genitalia, male (Figs 51–53). Abdominal segment IX with sternite somewhat barrel-shaped in ventral view. Segment X in form of a simple membranous plate, broad-based, obliquely truncate apically. Superior appendages about equal in length to tergum X. Inferior appendages forceps-like in ventral view, elongate, slender, apically acute, lateral basodorsal process slender, about two-thirds length of the inferior appendage, setose apically. Phallus stout, curving downwards.

Etymology. From the Greek *dibolia*—two-pointed lance, in reference to the shape of the inferior appendages.

Remarks. This species is known from north-western Western Australia and the Alligator Rivers region of Northern Territory. Two of the three Northern Territory records are from a lake and a billabong and it may well be restricted to lentic systems.

Triaenodes drepana sp. nov.

Figures 54–56

Material examined. Holotype, ♂, Northern Territory, Katherine Gorge National Park, 26 Jan 1977, M.S. and B.J. Moulds, (NMV, T-16392).

Paratypes: Northern Territory: 4 ♂, same data as for holotype, (NMV, genitalic prep. PT-777 illustrated); ♂, Birraduk Creek, 18 km E by N of Oenpelli, 12°17'S, 133°13'E, 4–5 Jun 1973, J.C. Cardale, (ANIC); ♂, 12 km NNE of Borroloola, 15°58'S, 136°21'E, 1 Nov 1975, J.C. Cardale, (ANIC); ♂, Roper River, Mataranka Homestead, 25 Jan 1977, M.S. and B.J. Moulds, (NMV); 3♂, Butterfly Gorge, Katherine Gorge National Park, 27 Jan 1977, M.S. and B.J. Moulds, (NMV); ♂, Cooper Creek, 11 km S by W of Nimbuwah Rock, 12°17'S, 133°20'E, 3–4 Jun 1979, J.C. Cardale, (ANIC); ♂, Magela Creek, S of Georgetown Billabong, 26 Mar 1983, A.J. Sharley, (NTM); 3♂, South Alligator River nr Coronation Hill, 9 Feb 1988, P. Dostine, (NMV); ♂, South Alligator River nr Coronation Hill, 16 Feb 1989, P. Dostine, (NTM); 2♂, Radon Springs, 1 hr before dawn, 14 Apr 1989, P. Suter

and A. Wells, (NMV), ♂, South Alligator River above Fisher Creek junction, 13°34'S, 132°34'E, 19–20 Apr 1989, P. Suter and A. Wells, (NMV), 5♂, Magela Creek, 15 Feb 1991, HV lt, A. Wells, (NMV), ♂, Magela Creek, at Rnm pipeline, 18–19 Feb 1991, P. Doetme, (NMV).

Other material. NW Western Australia: 3♂, Four Mile Creek, Kimberley, 2 Feb 1978, I.F.B., J.F. Bishop, (NMV), ♂, Maggie Creek, 3 Feb 1978, J.F. Bishop, (NMV), 15♂, Mitchell Plateau, Ian., Feb 1978, 1979, J.F. Bishop, J.C. Cardale, (NMV, ANIC), ♂, Pine Spring Creek, 2 Feb 1987, J.F. Bishop, (NMV).

Further material available in NTM and NMV from Magela Creek and Jabiru, Northern Territory.

Diagnosis. Grouped with *T. celata* and *T. diholta* but distinguished by having inferior appendages slender and strongly curved anteriorly and dorsally.

Description. Length of forewing, ♂ 5.0–5.8 mm.

Genitalia, male (Figs 54–56). Abdominal segment IX wedge shaped in ventral view. Segment X in form of a simple membranous plate, broad-based, tapered in distal half, somewhat irregular apically. Superior appendages about half length of tergum X. Inferior appendages forming a pair of symmetrical spine like processes, arched anteriorly and dorsally, basodorsal process filamentous. Phallus stout curved downwards in distal half.

Etymology. From the Greek *drepana* = sickle, in reference to the shape of the inferior appendages.

Remarks. This is a common species in northern Northern Territory and also occurs in NW Western Australia.

Triaenodes reclusa sp. nov.

Figures 57–59.

Material examined. Holotype, ♂, N. Queensland, Mulgrave River, W. of Gordonvale, 17°10'S, 145°53'E, 29 Apr 1979, A. Wells, (NMV, genitalic prep. PT 759 illustrated, I. 16428).

Paratype, ♂, N. Queensland, Woodbadda River, 15°58'S, 145°22'E, 28 Aug 1992, J.C. Cardale and P. Zborowski, (ANIC).

Diagnosis. This species shares with others in the group the overall appearance of segment IX, but the separation of the upper and lower parts of the segment is greater. As in *T. drepana* the inferior appendages form curved spines, but here there is also a well developed rounded mesoventral lobe and tergum X comprises a short, simple ventral plate and a slender upper structure.

Description. Length of forewing, ♂ 6.2 mm.

Genitalia, male (Figs 57–59). Abdominal segment IX with sternite elongate rectanguloid. Tergum X comprising an elongate upper structure, almost spatulate in dorsal view, in lateral view rather sinuous with a pair of upwardly directed small spurs; and a membranous, triangular median plate. Superior appendages slender, elongate, only slightly shorter than upper structure of tergum X. Inferior appendages rounded basally, produced laterally into long recurved spines, mesoventrally a rounded lobe covered densely with small peg like setae, lateral basodorsal process reduced to a small dorsal finger-like projection. Phallus, narrow proximally, swollen and slightly downturned in distal two-thirds.

Etymology. From the Latin *reclusus*, in reference to the distinctness of the male genitalia.

Remarks. This species is known from only two records in NE Queensland.

intricata complex

Ten Australian species, *Triaenodes intricata*, *T. perissotes* sp. nov., *T. implexa* sp. nov., *T. resima* sp. nov., *T. cymulosa* sp. nov., *T. conjugata* sp. nov., *T. allax* sp. nov., *T. mouldsi* sp. nov., *T. teretis* sp. nov., and *T. fuscanula* sp. nov. form the *intricata* complex on the basis of their males sharing the feature of an incomplete oblique groove on abdominal segment IX, and tergum X comprising an upper median structure and ventrally a pair of spines. In this set (see Figs 60–85) the inferior appendages generally have some kind of dorsomesal lobe bearing peg-like setae. The mesal basodorsal process is bifid, but generally more lobose than spiny; and the phallus is median in position.

All the species in this complex are eastern in distribution, members being found in Tasmania, southern South Australia and along the Dividing Range to NE Queensland. At least two close species, *T. nigrolineata* Kimmins, 1962 and *T. mondoana* Kimmins, 1962, occur in New Guinea.

Triaenodes intricata Neboiss

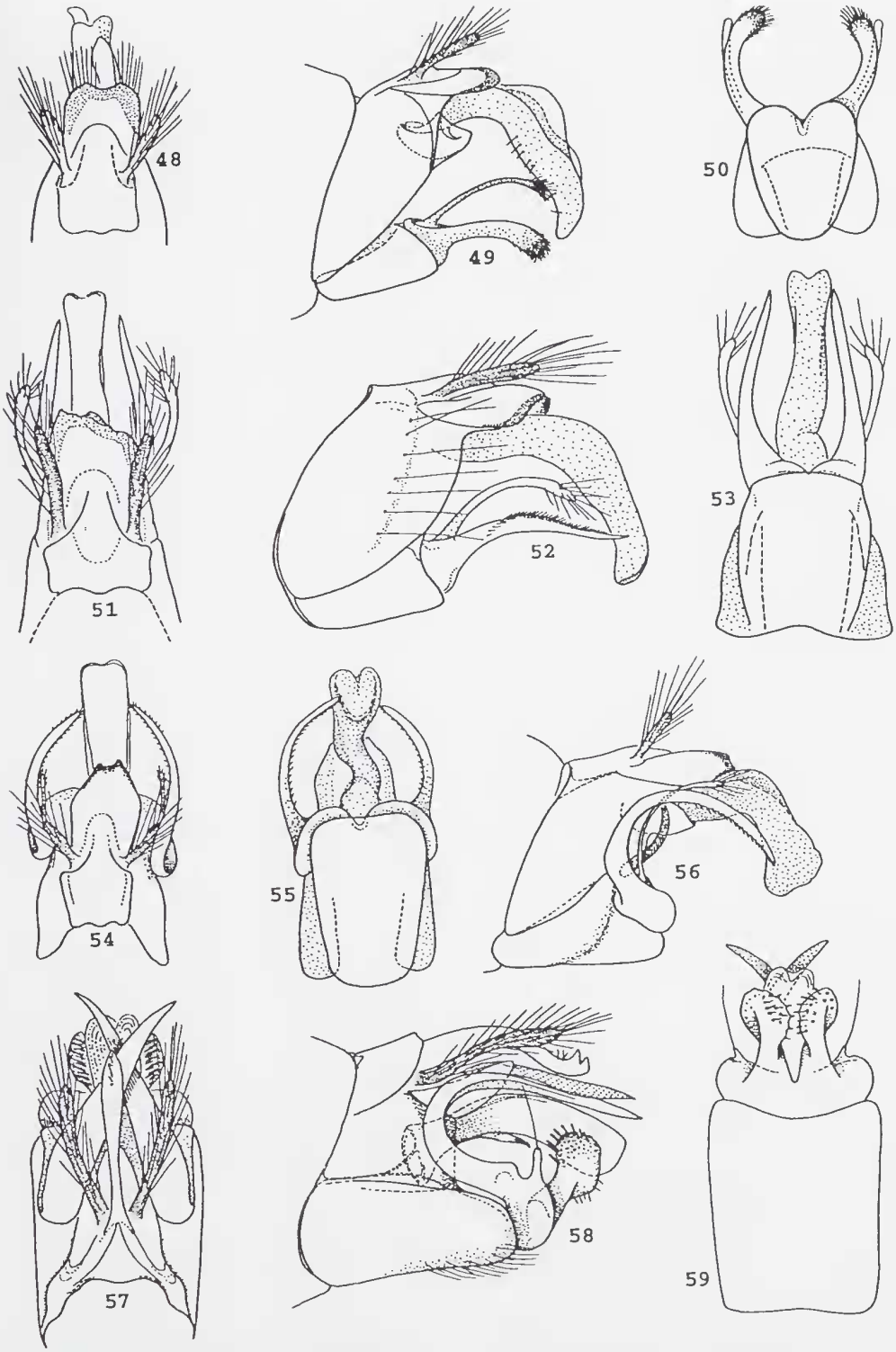
Figures 60, 61.

Triaenodes intricata Neboiss, 1977: 142.

Holotype, ♂, Tasmania, South Esk River, Evandale.

Material examined

Paratype, ♂, Tasmania, South Esk River, Evandale, 1 Mar 1967, A. Neboiss, (NMV, genitalic prep. PT-199).



Figures 48–59, male genitalia: 48–50, *Triaenodes celata* sp. nov., dorsal, lateral and ventral views; 51–53, *Triaenodes dibolia* sp. nov., dorsal, lateral and ventral views; 54–56, *Triaenodes drepana* sp. nov., dorsal, ventral and lateral views; 57–59, *Triaenodes reclusa* sp. nov., dorsal, lateral and ventral views.

Remarks. Known only from a small, clean, sandy-bottomed stream, *T. perissotes* is a close sister species to *Triaenodes implexa*, on the nearby mainland.

Triaenodes resima sp. nov.

Figures 66–68

Material examined. ♂, Victoria, Wingan River, 8 km S of Princes H-way, 37°37'S, 149°29'E, 30 Jan 1975, A. Neboiss, (NMV, T-16523).

Paratypes, 3♂, same data as holotype, (NMV, genitalic prep. PT-750 illustrated).

Diagnosis. This species closely resembles *T. implexa* and *T. perissotes*, but is distinguished by having more elongate parts, including longer superior appendages, longer and narrower parts of tergum X and more attenuated apices on the inferior appendages.

Description. Length of forewing, ♂ 6.2–6.7 mm.

Genitalia, male (Figs 66–68). Abdominal segment IX, in ventral view longer than wide; in lateral view the oblique groove and apicolateral margin separate a more or less triangular membranous area which effectively distances the upper and lower genitalic parts. Segment X with upper part elongate, apically tripartite, medial lobe acute apically, lateral lobes fine, extending well beyond medial lobe; ventral "spines" slender, unequal, divergent distally. Superior appendages elongate, about as long as upper part of tergum X. Inferior appendages in lateral view with apex produced posteriorly, upturned; mesodorsal lobe about twice as long as wide, rounded apically; lateral basodorsal process short, triangular; mesal basodorsal process bilobed, outer lobe slender, arching downwards, inner lobe swollen in median section, strongly down-turned, a small cluster of short setae apically. Phallus narrow proximally, down-turned and swollen in distal half.

Etymology. From the Latin *resimus*—turned upwards, in reference to the shape of the inferior appendages.

Remarks. Known only from the type locality in eastern Victoria.

Triaenodes conjugata sp. nov.

Figures 69–71

Material examined. holotype, ♂, Victoria, Bells Clearing, 6 km S of Aberfeldy, 37°45'S, 146°23'E, 6 Feb 1977, A.A. Calder, (NMV, T-16566).

Paratypes, Victoria: 2♂, same data as for holotype, (NMV, genitalic prep. PT-743 illustrated); ♂, same loc., 2 Dec 1977, A.A. Calder, (ANIC); 10♂, Yarra River, below Upper Yarra Dam, 28 Feb 1976, A. Neboiss, (NMV); ♂, Yarra River nr McMahons Creek, 19 Feb 1976, A. Neboiss, (NMV); ♂, Yarra River, Warburton East, 17 Feb 1976, A. Neboiss, (NMV); 6♂, Buffalo River nr Abbeyards, 27 Jan 1960, A. Neboiss, (NMV); 3♂, Ovens River, Porepunkah, 26 Jan 1960, A. Neboiss, (NMV).

Other material. Victoria: ♂, Mitta Mitta River, 4 Feb 1961, E. Matheson, (NMV); ♂, Mitta Mitta River, 8 km NE of Benambra, 5 Feb 1974, A. Neboiss, (NMV); ♂, 2♀, Wongungurra and Crooked River junction, 9 Feb 1981, J. Blyth, (NMV); 3♂, ♀, Myrtleford, Eucalyptus forest, small creek, 23 Jan 1973, A. Neboiss, (NMV); 3♂, Murrindal, 6 Jan 1967, E. Hamilton-Smith, (NMV); ♂, 2♀, Little River, 6 km E of Wulgulmerang, 12 Dec 1976, A. Neboiss, (NMV); 3 ♂, 4♀, Cobungra River, Anglers Rest, 4 Feb 1974, A. Neboiss, (NMV); ♂, same loc., 30 Jan 1957, A. Neboiss, (NMV); 2♂, same loc., 15 Jan 1982, A. Wells, (NMV); ♂, ♀, Wellington River, 23 Km NNE Licola, 21 Feb 1978, A.A. Calder, (NMV); ♂, 2♀, Tanjil River nr Old Tanjil, 5 Feb 1980 (no collector), (NMV); 5♂, 7♀, Cann River, 2 km S of Buldah, 17 Dec 1976, A. Neboiss, (NMV).

Also numerous records from many eastern Victorian rivers.

Diagnosis. In general form of male genitalia, *T. conjugata* sp. nov. resembles others in the group, but it is distinguished in lateral view by the more regular and apically truncate appearance of the inferior appendages and in dorsal view by tergum X with median dorsal lobe more elongate and with its apicomedial process longer than its lateral processes.

Description. Length of forewing, ♂ 6.5–7.3 mm.

Genitalia, male (Figs 69–71). Abdominal segment IX narrow and produced posteroventrally with an oblique lateral fold forming a pronounced pocket on each side and a rounded membranous area at the base of the inferior appendages. Tergite X dorsally comprising a slender elongate lobe which is produced distally to the length of the right ventral "spine", divided in distal third to form 2 short lateral processes and a longer, setose medial process, and basally above this lobe another short bilobed process; ventrally the paired "spines" are separated to their bases and are unequal, varying such that in about equal numbers of specimens the left less than half length of right and vice versa. Superior appendages slender, elongate. Inferior appendages stout, in lateral view almost rectangular, lateral basodorsal process probably represented by a short dorsal process on the upper margins; mesal basodorsal process divided to form a pair of lobes, the outer one hooked downwards, the inner angled posteriorly. Phallus elongate, curved down-wards, narrow proximally, stout in distal half.

Other material. Tasmania: 5 ♂, Tooms Lake, 4 Dec 1974, A. Neboiss, (NMV); 1 ♀, Scamander River, Upper Scamander, 9 Nov 1972, A. Neboiss, (NMV); 1 ♀, South Esk River, Evandale, 1 Mar 1967, (NMV); 11 ♂, ♀, Apsley River, 5 km NW of Bicheno, 20 Dec 1988, J. Jackson, (NMV); 3 ♀, Derwent River, 2 km NW of Derwent Bridge, 12 Feb 1971, A. Neboiss, (NMV); 1 ♀, Gordon River, 1 km above First Split, 11 Jan 1977, A. Neboiss et al., (NMV); 2 ♀, Swamp in Olga River, 19 km above Gordon River junct., 13 Jan 1977, A. Neboiss and R. Swain, (NMV); 1 ♀, Lake Fiddler, Lower Gordon River, 13 Dec 1977, D. Coleman, (NMV); 14 ♀, Sandfly Creek at Scotts Peak Road, 9 Feb 1988, K. Walker and J. Jackson, (NMV).

Diagnosis. Resembling *T. implexa* sp. nov., *T. perissotes* sp. nov. and *T. resima* sp. nov. in general form of male genitalia, but the form of tergum X, with a simple filamentous upper part, is quite distinct from those species.

Description. Length of forewing, ♂ 7–8 mm.

Genitalia, male (Figs 60, 61). Abdominal segment IX with an incomplete oblique lateral groove effectively distancing the upper and lower genitalic parts. Segment X comprising an upper median filament which is setate apically and paired equal length spines, the right one of which is upturned. Superior appendages short, tapered, about a third length of spines of tergum X. Inferior appendages in lateral view short, tapered and upturned apically, and with a rounded mesodorsal lobe; lateral basodorsal process short with a pair of short setae apically. Phallus short, narrow at base, greatly expanded and down-turned in distal two-thirds.

Remarks. This species is known only from Tasmania, where it appears to be quite widespread. It has been collected from December to early February.

Triaenodes implexa sp. nov.

Figure 62

Material examined. Holotype, ♂, South Australia, Mitcham, Brownbill Creek, A. Wells, 3 Mar 1976, (NMV).

Paratypes: ♂, same data as for holotype, (NMV, genitalic prep. PT-773 illustrated); ♂, same locality and collector as holotype, 21 Nov 1983, (NMV); ♂, South Australia, Ironbank, 17 Nov 1983, A. Wells, (NMV).

Diagnosis. Triaenodes implexa most closely resembles *T. perissotes* from which it is distinguished by the shape of the upper part of tergum X in which the terminal three lobes are equal in length.

Description. Length of forewing, ♂ 6.4–7.6 mm.

IX, with the oblique groove forming lateral ridges in ventral aspect. Segment X with upper part tripartite and all lobes equal in length; ventral "spines" slender, divergent distally. Superior appendages elongate, about length of tergum X. Inferior appendages in lateral view slightly upturned apically; a stout mesodorsal lobe inside the small lateral basodorsal process; mesal basodorsal process bilobed, outer lobe slender, arching downwards, inner lobe also slender, somewhat strap-like medially, strongly down-turned, a small cluster of short setae apically. Phallus narrow at base, down-turned and swollen in distal half.

Etymology. from the Latin *implexus*—interwoven, in reference to the male genitalic structures.

Remarks. This species is known only from the vicinity of Adelaide, South Australia. Larvae netted from among the dense macrophytes at one of the collecting sites were probably of this species.

Triaenodes perissotes sp. nov.

Figures 63–65

Material examined. Holotype, ♂, South Australia, Kangaroo Island, Rocky River at bridge, A. Wells, 20 Dec 1980, (NMV, T-16747).

Paratypes: 18 ♂, same data as for holotype, (NMV, genitalic prep. PT-749 illustrated).

Diagnosis. This species resembles *T. implexa* but is distinguished by unequal lobes subapically on the upper part of tergum X.

Description. Length of forewing, ♂ 6.5–7.5 mm.

Genitalia, male (Figs 63–65). Abdominal segment IX, quadrate in ventral view, lateral suture effectively distancing the upper and lower genitalic parts. Segment X comprising an upper part with median lobe of tripartite apex about half length of lateral lobes; "spines" of ventral part slender, equal, divergent distally. Superior appendages elongate, shorter than spines of tergum X. Inferior appendages short, in ventral view obliquely truncate apically; in lateral view with apex slightly upturned and mesodorsal lobe about 1.5 × basal width, rounded apically; lateral basodorsal lobe short; mesal basodorsal process bilobed, outer lobe slender, slightly arched downwards, inner lobe slender, spine-like, strongly down-turned. Phallus narrow at base, down-turned and swollen in distal half.

Etymology. From the Greek *perisseia*—abundance, in reference to the numerous projections in the male genitalia.

Etymology. From the Latin *junctus*—unite = conjugate, in reference to occurrence of both short and long genitalic processes in the one species.

Remarks. Commonly collected from eastern and central Victoria.

Triaenodes cymulosa sp. nov.

Figures 72–74

Material examined. Holotype, ♂, SE Queensland, Goomburra State Forest, NE of Warwick, 28°03'S, 152°07'E, 20 Jan 1986, G. Theischinger (NMV, T-16217).

Paratypes, 1♂, same data as for holotype, (NMV genitalic prep. PT-1747 illustrated).

Diagnosis. This species resembles *T. implexa* and *T. resima* but shows more extreme development of most structures, including the upper membranous part of segment IX, and has the ventral part of tergum X reduced to two short, apically rounded lobes.

Description. Length of forewing, ♂ 6.3–6.4 mm

Genitalia, male (Figs 72–74). Abdominal segment IX in lateral view produced posteroventrally beyond a pronounced groove to form a triangular part dorsal to which is a folded or concertinaed membranous area. Tergum X comprising a pair of dorsomedial digitiform lobes above an elongate median lobe which is tripartite distally with the median structure setose and longer than the lateral ones; ventral "spines" reduced to short apically rounded lobes. Inferior appendages in lateral view slender, upturned, mesodorsal lobe tapered distally, lateral basodorsal process short, digitiform, mesal basodorsal process bifid, strongly arched with inner spine almost reaching to tip of inferior appendages, outer lobe slender with setae at apex. Phallus elongate, slightly wider distally than proximally, down-turned.

Etymology. From the Latin *cymula*—cluster of branches in reference to the male genitalia.

Remarks. Known only from the type locality in SE Queensland.

Triaenodes allax sp. nov.

Figure 75

Material examined. Holotype, ♂, N Queensland, Tinaroo Dam, 2 km on Mt Edith Road, 23 Jun 1971, E.F. Riek, (ANIC, genitalic prep. PT-757 illustrated).

Other material. 3♀, collected with holotype, may be this species, (ANIC, genitalic prep. PT-1137).

Diagnosis. Triaenodes allax closely resembles *T. cymulosa* in the shape of abdominal segment IX and of the mesal basodorsal processes on the inferior appendages but in other respects the inferior appendages are more like those of *T. conjugata*. In the form of tergum X, too, this species and *T. conjugata* are closely similar.

Description. Length of forewing, ♂ 6.1 mm.

Genitalia, male (Fig. 75). Abdominal segment IX strongly produced posteroventrally, beyond a pronounced groove, to form a triangular part below a membranous area. Segment X with dorsal lobe longer than superior appendages, apically trifurcate; spines reduced to short stubs. Superior appendages slender, elongate, shorter than median structure of tergum X. Inferior appendages broad in lateral view, apically truncate; lateral basodorsal process very short, subtriangular; mesal basodorsal process bifid, outer lobe filamentous, arched posteriorly and setose apically, inner lobe slender, elongate, forming a fine spine arching alongside the phallus. Phallus elongate, slender throughout length.

Etymology. From the Greek, *allax*—crosswise, alternate, in reference to double crossing of processes.

Remarks. Known only from the type locality in NE Queensland, this species closely resembles *T. nigrolineata* Kimmins, 1962 from New Guinea.

Triaenodes fuscinula sp. nov.

Figures 76–78

Material examined. Holotype, ♂, Victoria, Lake Mountain, 4600 ft, 17 Jan 1965, A. Neboiss, (NMV, T-16572).

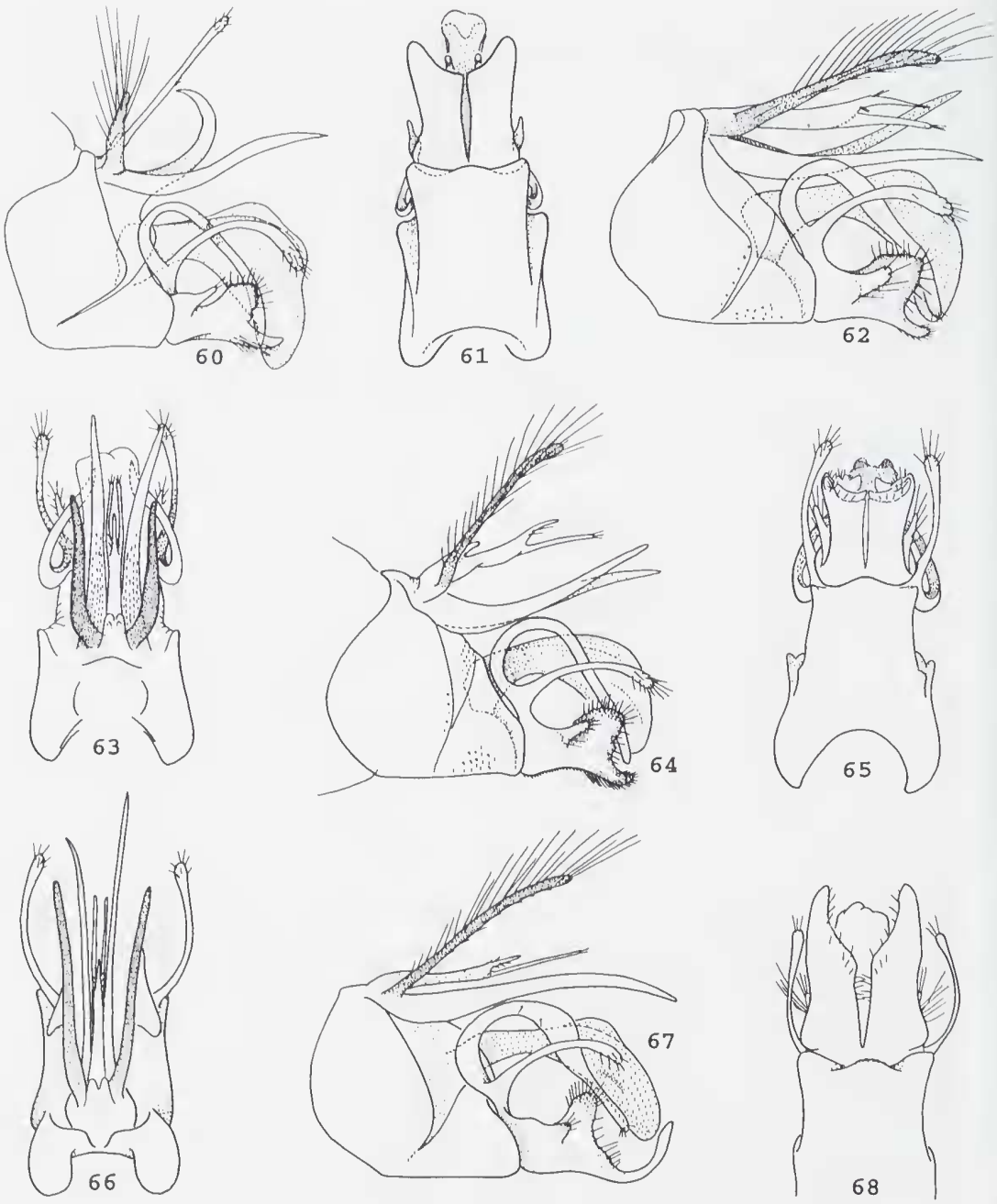
Paratypes, Victoria: 3♂, same loc. as for holotype, 17 Jan 1961, A. Neboiss, (NMV); 5♂, same loc. as for holotype, 11 Feb 1982, A. Neboiss and K. Walker, (NMV); ♂, 8 km NE Toolangi, 2 Dec 1970, A. Neboiss, (NMV); ♂, Delegate River, Gunmark track, 12 km SW of Bendock, 15 Dec 1976, A. Neboiss, (NMV, genitalic prep. PT-797 illustrated); ♂, Delegate River, 8 km SW of Bendock, 15 Dec 1976, A. Neboiss, (NMV).

Other material. Victoria, ♂, Murrindindi, Nov. 1987, A. Neboiss, (NMV); ♂, Wilsons Promontory, 26 Sep 1953, G.W. Douglas, (NMV).

Diagnosis. In the form of segment IX this species most closely resembles *T. conjugata* but the shape of the inferior appendages is closer to that of *T. resima*. *Triaenodes fuscinula* is distinguished by having the mesal basodorsal process bifid but very short and the spines of tergum X unequal.

Description. Length of forewing, ♂ 6.9–7.9 mm.

Genitalia, male (Figs 76–78). Abdominal segment IX, subrectangular in ventral view; in lateral



Figures 60–68, male genitalia: 60, 61, *Triaenodes intricata* Neboiss, lateral and ventral views; 62, *Triaenodes implexa* sp. nov, lateral view; 63–65, *Triaenodes perissotes* sp. nov., dorsal, lateral and ventral views; 66–68, *Triaenodes resima* sp. nov., dorsal, lateral and ventral views.

view with a deep oblique groove resulting in a stout distal extension. Segment X comprising an apically tripartite upper structure and ventrally paired slender, unequal spines, left spine about half length of right. Superior appendages slender, shorter than dorsal lobe of tergum X. Inferior appendages produced and tapered, narrow and upturned in distal section; dorsomesal lobe short, somewhat fan-shaped; lateral basodorsal process digitiform; mesal basodorsal process bilobed, outer lobe short, straight, digitiform, inner lobe slender, scythe-shaped, at base a rounded process. Phallus elongate, narrow at base, down-turned and swollen in distal half, with a lobose dorsal process.

Etymology. Latin, *fuscinula*—three-pronged fork, in reference to tergum X.

Remarks. Despite concentrated collection efforts throughout Victoria, *T. fuscinula* is known only from a few scattered localities. It is almost certainly rare; collecting dates are from November to February.

Triaenodes mouldsi sp. nov.

Figures 79–82

Material examined. Holotype, ♂, N Queensland, Middle Claudie River, Iron Range, 2–9 Sep 1974, M.S. Moulds (NMV, T-16528).

Paratypes, NE Queensland: 5♂, same data as for holotype, (NMV); 4♂, same loc. as for holotype, 19.ix–23 Oct 1974, (NMV); ♂, Iron Range airstrip, 16 Sep 1974, M.S. Moulds, (NMV); ♂, Lockerby area, Cape York, 13–27 Apr 1973, S.R. Monteith, (QM); 5♂, West Claudie River, Iron Range, 17 Sep 1974, M.S. Moulds (NMV); ♂, Iron Range, 5 May 1975, M.S. Moulds, (NMV); 2♂, Gordon Creek, Iron Range, 18.iv–27 May 1975, M.S. Moulds, (NMV); 7♂, Upper Jardine River, Cape York Peninsula, 11°10'S, 142°35'E, 13–27 Oct 1979, M.S. Moulds, (NMV, genitalic prep. PT-763 illustrated); ♂, McIvor River, Cape York Peninsula, 15 Feb 1982, M.S. Moulds, (NMV); 15♂, 2–11 km NE Mt Tozer, 30.vi–10 Jul 1986, J.C. Cardale, (ANIC, NMV); 2♂, Claudie River, Iron Range, 10 Nov 1988, K. Walker, (NMV); ♂, Bertie Creek, 1 km SE Heathlands H.S., 4 Feb 1992, D. Cartwright and A. Wells, (QM); ♂, Gunshot Creek at telegraph crossing, 14–16 Feb 1992, D. Cartwright and A. Wells, (QM).

Other material. NE Queensland: ♂, ♀, Mt Molloy, 13 Jun 1971, E.F. Riek, (ANIC); ♂, McIvor River crossing, 40 km N Cooktown, 15–18 Jun 1976, S.R. Monteith, (QM); ♂, ♀, Cockatoo Creek, 19 Aug 1992, J.C. Cardale, (ANIC); ♂, Moreton HS, 12°27'S, 14°38'E, 21 Jun 1993, I.D. Naumann and P. Zborowski, (ANIC).

Northern Territory: ♂, Katherine River Gorge N.P., 13 Aug 1979, J. Blyth, (NMV); ♂, Katherine River Gorge N.P., 1 Apr 1981, M. Malipatil, (NTM).

Diagnosis. Triaenodes mouldsi most closely resembles *T. cymulosa, T. conjugata* and *T. allax* from which it is distinguished by the irregular appearance of the inferior appendages in lateral view and unequal ventral "spines" of tergum X.

Description. Length of forewing, ♂ 6.6–7.2 mm. Wings (Fig. 79) are distinctive in fresh specimens, with dark spots towards the apices.

Genitalia, male (Figs 80–82). Abdominal segment IX divided laterally by a deep groove in which one of the spines of the mesal basodorsal process of the inferior appendage rests. Tergum X with upper part in form of a long median structure, swollen and setose apically; "spines" of ventral part unequal, left shorter than superior appendages, right extended beyond apex of upper structure of tergum X. Superior appendages slender, about half length of median structure of tergum X. Inferior appendages relatively narrow in lateral view expanded and irregular in shape apically; lateral mesodorsal process digitiform, arising on inner margin near base; mesal basodorsal process bilobed, outer lobe long, spiny, curving anteriorly and arching posteriorly, inner lobe much shorter, curving towards tip of inferior appendage. Phallus, slender at base, greatly swollen and deeply divided in distal two-thirds.

Etymology. Named for M.S. Moulds, who has collected extensive material from Cape York localities.

Remarks. This appears to be a common species on Cape York and also occurs in northern Northern Territory.

Triaenodes teresis sp. nov.

Figures 83–85

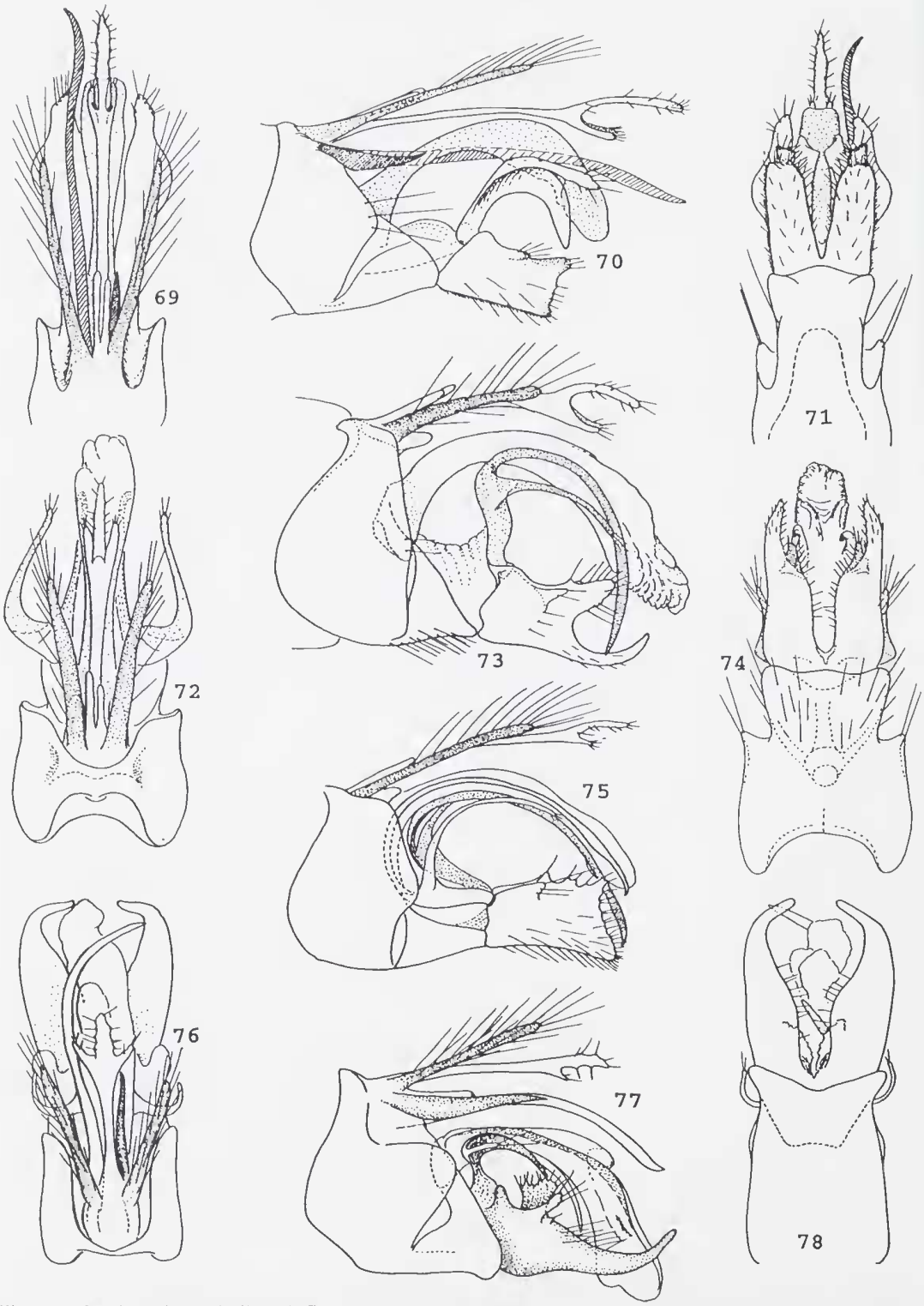
Material examined. Holotype, ♂, North Queensland, Mt Bartle Frere, 0.5 km N of South Peak, 6–8 Nov 1981, 1500 ♂ asl, Earthwatch/QM Expedition, (QM).

Paratypes, N Queensland: 2♂, same data as for holotype, (NMV, genitalic prep. PT-1090 illustrated); Bellenden Ker Range, Summit TV Station, 1560 m asl, 1–7 Nov 1981, Earthwatch/QM Expedition, (QM).

Diagnosis. T. teresis resembles *T. mouldsi* from which it is distinguished by the more regular appearance of the inferior appendages and shorter upper part and symmetrical ventral spines of tergum X.

Description. Length of forewing, ♂ 6.1–6.6 mm.

Genitalia, male (Figs 83–85). Abdominal segment IX in ventral view narrowly rectanguloid distally, widened abruptly towards base; in lateral view narrowly extended distally beyond a



Figures 69–78, male genitalia: 69–71, *Triaenodes conjugata* sp. nov., dorsal, lateral and ventral views; 72–74, *Triaenodes cymulosa* sp. nov., dorsal, lateral and ventral views; 75, *Triaenodes allax* sp. nov., lateral view; 76–78, *Triaenodes fuscinula* sp. nov., dorsal, lateral and ventral views.

complex, with which members share similarities in the form of the male abdominal segment IX and basic form of tergum X and inferior appendages. Members of this set are characterised by the simpler form of the inferior appendages in which the mesal basodorsal process is generally lobose, curving posteriorly and often is foot-shaped. Species in this complex more or less conform with Yang and Morse's subgenus *Austrotriaena*, however, they are clearly part of a broader complex which overlaps with subgenus *Triaenodella*.

Species in this complex are found in eastern Australia along the Great Dividing Range from Victoria to north Queensland. Allied species include *Triaenodes lanceolata* Kimmins, 1957 and *T. trifida* Kimmins, 1957 from Guam, *T. tafana* Kimmins, 1962 from New Guinea and *T. fijianus* Mosely, 1941 from Fiji, all of which were referred by Yang and Morse (1993) to their subgenus *Austrotriaena*.

Triaenodes bernaysae Korboot

Figures 89, 90

Triaenodes bernaysae Korboot, 1964: 50.

Material examined. Holotype, ♂, Queensland, Cedar Creek, (QM).

Paratypes New South Wales: 2♂, 2♀, Barrington Tops, Tubrabucea, 17 Nov 1953, A. Neboiss, (NMV); ♂, ♀, 8 mls W of Dorrigo, 22 Feb 1966, E.F. Riek, (NMV); 5♂, 9♀, Barrington Tops, 9 Nov 1967, N. Dobrotworsky, (NMV); 9♂, 4♀, 24 km S of Ebor, 10 Nov 1967, N. Dobrotworsky, (NMV); 4♂, 2♀, Boonoo Boonoo State Forest, Nov 1990, G. Theischinger, (NMV); ♂, 2♀, Rawley Point, 14 Nov 1992, D. Rentz and K. McCarron, (ANIC).

Queensland: ♂, 2♀, Acaeia Ridge, Brisbane, 20 Jan 1963, (no collector given), (NMV); 4♂, 1♀, Bulimba Creek, Brisbane, 23 Oct 1979, (no collector given), (NMV, genitalic prep. PT-721 illustrated); ♂, Strathpine, nr Brisbane, 3 Dec 1984, G. Theischinger, (NMV).

Diagnosis. Triaenodes bernaysae males probably illustrate an early stage in development of the mesal basodorsal lobe in this group and in that respect resemble *T. verberata* sp. nov., but the other genitalic structure are relatively specialised. The dorsomesal lobe on the inferior appendages is pronounced and densely covered with short setae, and the ventral part of tergum X is asymmetrical; the phallus has a short process middorsally.

Description (revised after Korboot, 1964). Length of forewing, ♂ 6.5–7.0 mm, ♀ 5.9–6.8 mm.

Genitalia, male (Figs 89, 90). Abdominal segment IX produced lateroventrally distal to a lateral groove, ventrally with a medial U-shaped excavation in apical margin. Tergum X comprising a short, apically setose median lobe above a pair of unequal spines, the right less than half the length of the left. Superior appendages slender, about twice length of median lobe of tergum X. Inferior appendages broad based, narrow and upturned in distal half, mesodorsal lobe broad and densely setose, mesal basodorsal lobe slender, curved downwards, with a slight middorsal "hump". Phallus uniform in diameter throughout length, curved downwards, with a short process middorsally.

Remarks. Collected from northeastern New South Wales to southeastern Queensland, from October to February, this appears to be quite a widespread species with a typically temperate spring-summer emergence period.

Triaenodes verberata sp. nov.

Figures 86–88

Material examined. Holotype, ♂, N Queensland, Heathlands, 11°45'S, 142°35'E, 18 Aug 1992, at light, J.C. Cardale and P. Zborowski, (ANIC, genitalic prep. PT-2052 illustrated).

Paratype ♂ N Queensland 11 km W by N Bald Hill, Mellwraith Range 500 m asl. 13°44'S 143°20'E, 26 Jun 1989, I. Naumann (NMV).

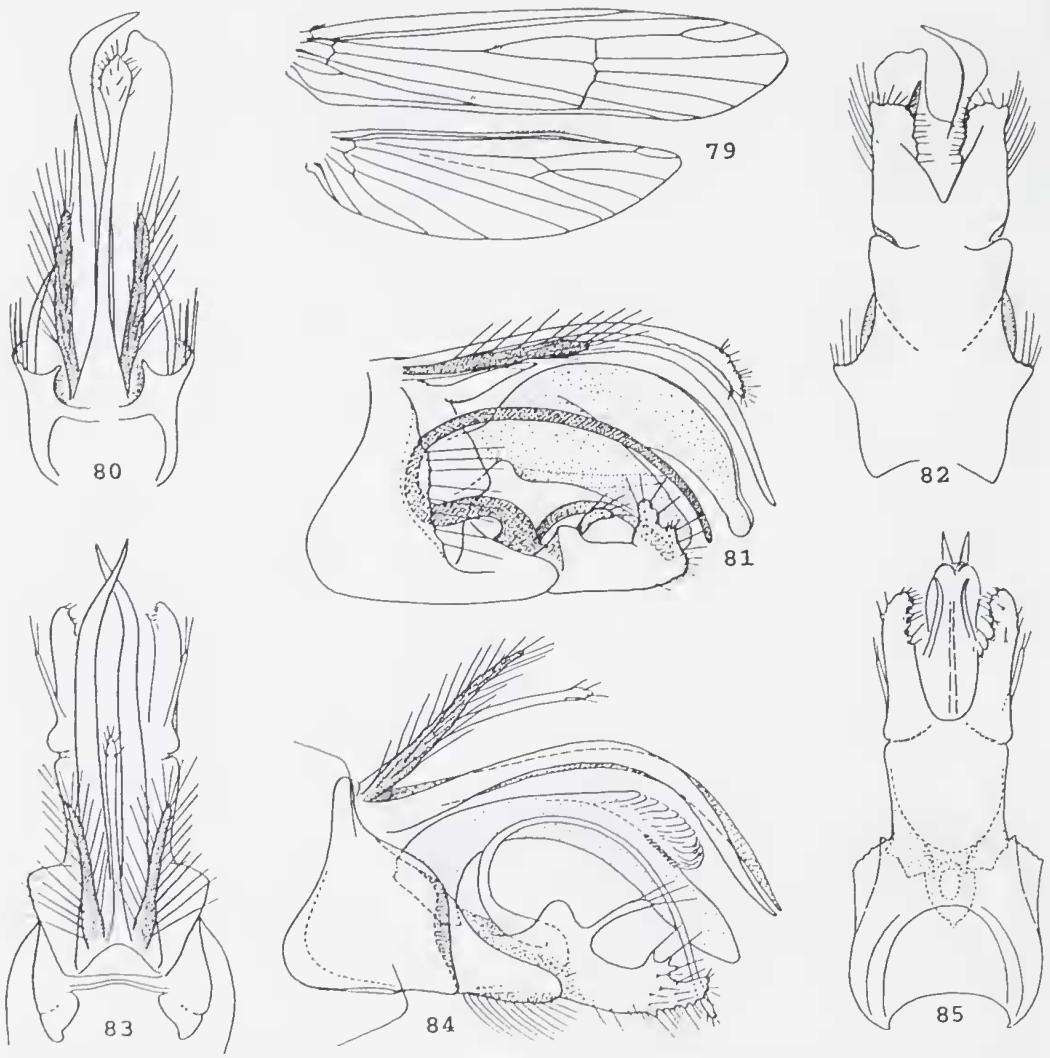
Diagnosis. In general form the male genitalia of this species resemble those of *T. cuspiosa*, however, *T. verberata* sp. nov. shows curious development of tergum X with one "spine" of the ventral part far longer than the rest of the genitalic structures and twisted slightly.

Description. Length of forewing, ♂ 3.7 mm.

Genitalia, male (Figs 86–88). Abdominal segment IX short and broad in lateral view, with a short oblique lateral groove beyond which the segment is produced posteriorly. Tergum X comprising a slender, unequally bilobed dorsomedial structure above a single elongate, distally slightly twisted "spine". Inferior appendages in lateral view skittle-shaped, apically rounded; mesal basodorsal process a long lobe, arching dorsally and posteriorly, expanded slightly near base. Phallus narrow, curved downwards, swollen apically.

Etymology. From the Latin *verber* – whip referring to the long sinuous spine of the ventral part of tergum X.

Remarks. This species is known only from far north Queensland.



Figures 79–85: 79–82, *Triaenodes mouldsi* sp. nov., wings, male genitalia, dorsal, lateral and ventral views; 83–85, *Triaenodes teresis* sp. nov., male genitalia, dorsal, lateral and ventral views.

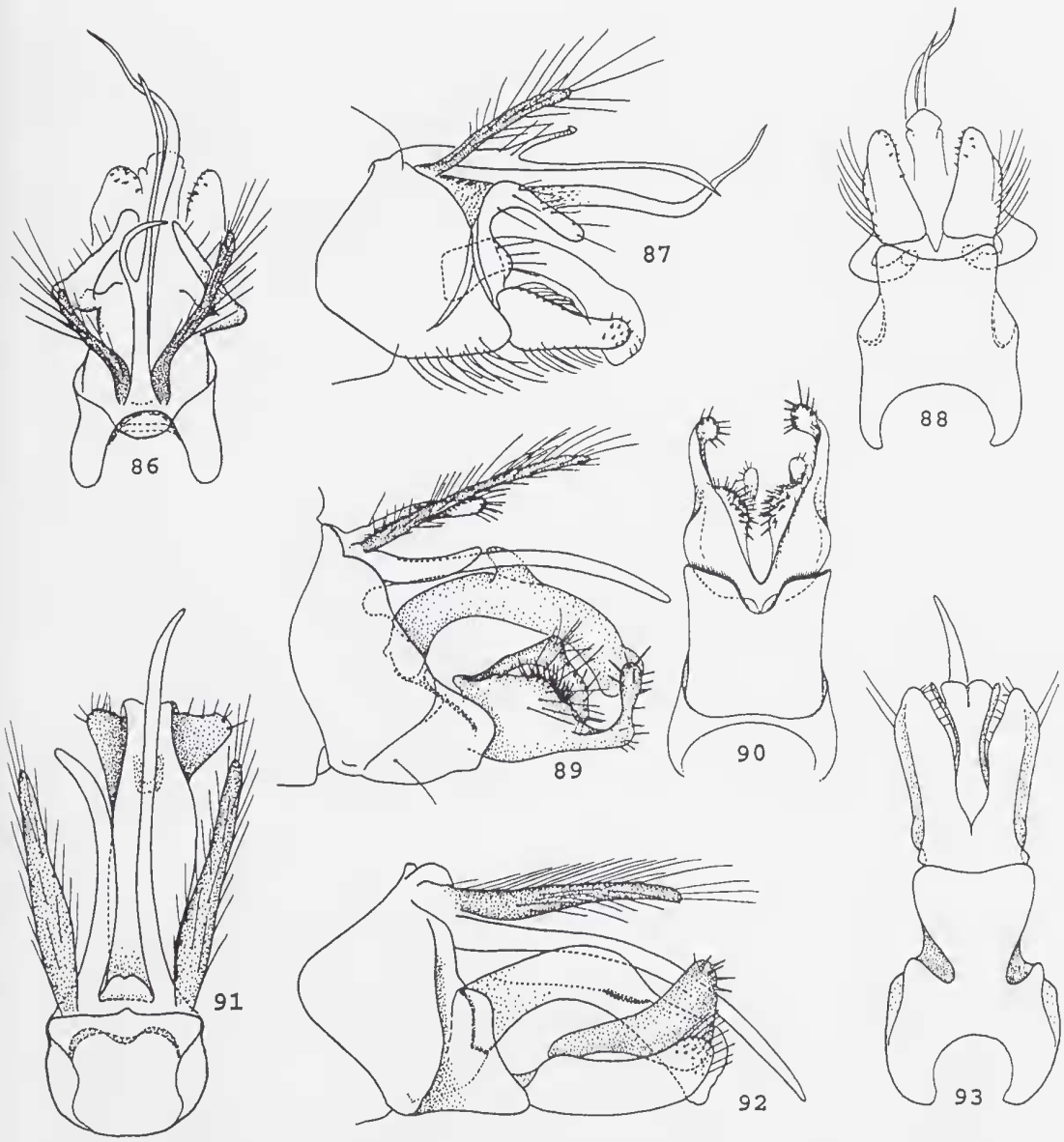
pronounced groove. Tergum X comprising an upper apically setose filement, slightly longer than superior appendages and below that a pair of equal elongate spines, intersecting subapically. Inferior appendages clasper-shaped in ventral view, in lateral view somewhat irregular in shape with bases of dorsal subapical setae papillose, lateral basodorsal process digitiform with several apical setae, dorsally between this process and the slender strongly recurved unipartite mesal basodorsal process is a rounded lobe. Phallus long with a horseshoe-shaped sclerite dorsally.

Etymology. From the Greek *teretikos*—watchful, observant, in reference to the Earthwatch expedition.

Remarks. This species is known only form the Bellenden Ker Range in NE Queensland. Males closely resemble those of the New Guinea species, *T. modoana* Kimmins.

bernaysae complex

The *bernaysae* complex of species (see Figs 86–114) is closely allied with the *intricata*



Figures 86–93, male genitalia: 86–88, *Triaenodes verberata* sp. nov., dorsal, lateral and ventral views; 89, 90, *Triaenodes bernaysae* Korboot, lateral and ventral views; 91–93, *Triaenodes corynotra* sp. nov., dorsal, lateral and ventral views.

the inferior appendage; mesal basodorsal process narrow at base, greatly expanded and truncate dorsally, rounded ventrally. Phallus broadest distally, downturned.

Etymology. From the Greek *probolos*—projecting prominence, in reference to the inferior appendages.

Remarks. This species is known only from the type locality in NE Queensland.

Triaenodes notalia sp. nov.

Figures 100–102

Material examined. Holotype ♂, Victoria, Yarra River, 2 km N of Wonga Park, 23 Feb 1976, A. Neboiss, (NMV, T-16219).

Paratypes, Victoria: 37 ♂, same data as for holotype, (NMV, genitalic prep. PT-798 illustrated, ANIC); 3 ♂, Yarra River–Diamond Creek junction, 14 Mar 1976, A. Neboiss, (NMV, ANIC).

Triaenodes cuspiosa sp. nov.

Figures 94–96

Material examined. Holotype, ♂, Victoria, Genoa creek, 5 km W of Genoa, 31 Jan 1975, A. Neboiss, (NMV, T-16356, genitalic prep. PT-752 illustrated)

Paratype: ♂, NSW, small creek nr Berowa, 19 Nov 1989, G. Theischinger, (NMV).

Diagnosis. Males of this species resemble those of *T. bernaysae* in ventral view, having the mesodorsal lobes on the inferior appendages well developed, but differ in that the mesal basodorsal process is greatly expanded distally to form a foot-shaped structure.

Description. Length of forewing, ♂ 6.3–6.7 mm.

Genitalia, male (Figs 94–96). Abdominal segment IX with a well developed "collar" formed by the lateral groove and posterior extension of the segment ventrolaterally. Tergite X comprising a short simple dorsal part and ventrally a pair of unequal spines, right shorter than left. Superior appendages slender, about as long as the inferior appendages. Inferior appendages in ventral view clasper-shaped, with a well developed, setose mesodorsal lobe at base; lateral basodorsal process small, digitiform; mesal basodorsal lobe narrow proximally, deeply humped at about half length to form a foot-shaped structure. Phallus slender medially, dilated distally.

Etymology. From the Latin *cuspis*—point, and *osus*—abundance, in reference to numerous small spikey setae on the mesal surface of the inferior appendages.

Remarks. Triaenodes cuspiosa appears to be restricted in distribution and probably is rare as it has been collected from only two localities, one in eastern Victoria, the other near Sydney, New South Wales.

Triaenodes corynotra sp. nov.

Figures 91–93

Material examined. Holotype ♂, Northern Territory, Kakadu National Park, Radon Creek, 12°45'S, 132°55'E, 14 Apr 1989, P. Suter and A. Wells, (NMV, T-16325).

Paratypes, Northern Territory: 4 ♂, same data as for holotype, (NMV); ♂, same locality and collectors as for holotype, 6 Jun 1988, (NMV); ♂, Radon Creek, Kakadu National Park, 3 Sep 1979, J. Blyth, (NMV, genitalic prep. PT-765 illustrated); ♂, 16 km E by N Mt Cahill, 12°50'S, 132°51'E, 16 Nov 1972, J.C. Cardale, (ANIC).

Diagnosis. Males of this species have genitalia of the same general form as *T. notalia* sp. nov., *T. probolia* sp. nov., *T. wannonense* sp. nov. and *T. forficata* sp. nov. but the structures are less elabo-rate and the mesal basodorsal process on the inferior appendage is club-shaped, not produced downwards and attenuate apically.

Description. Length of forewing, ♂ 5.3–5.8 mm.

Genitalia, male (Figs 91–93). Abdominal segment IX with an oblique groove producing strong constrictions laterally. Segment X comprising a short apically indented membranous upper structure between paired unequal spines, left longer than right by one third, right as long as superior appendages. Superior appendages unusually stout, elongate. Inferior appendages stout, almost cylindrical in lateral view, slightly upturned distally, in ventral view tapered distally; mesodorsal lobe and lateral basodorsal process absent; mesal basodorsal process in lateral view narrow in basal section, expanded and club-shaped distally. Phallus stout throughout length, slightly downturned with a dorsal sclerite at about half length.

Etymology. From the Greek *korynodes*—club, mace (clublike) in reference to the process on the inferior appendages.

Remarks. Triaenodes corynotra is known only from the restricted locality, Radon Springs in Kakadu National Park, and another very close site.

Triaenodes probolia sp. nov.

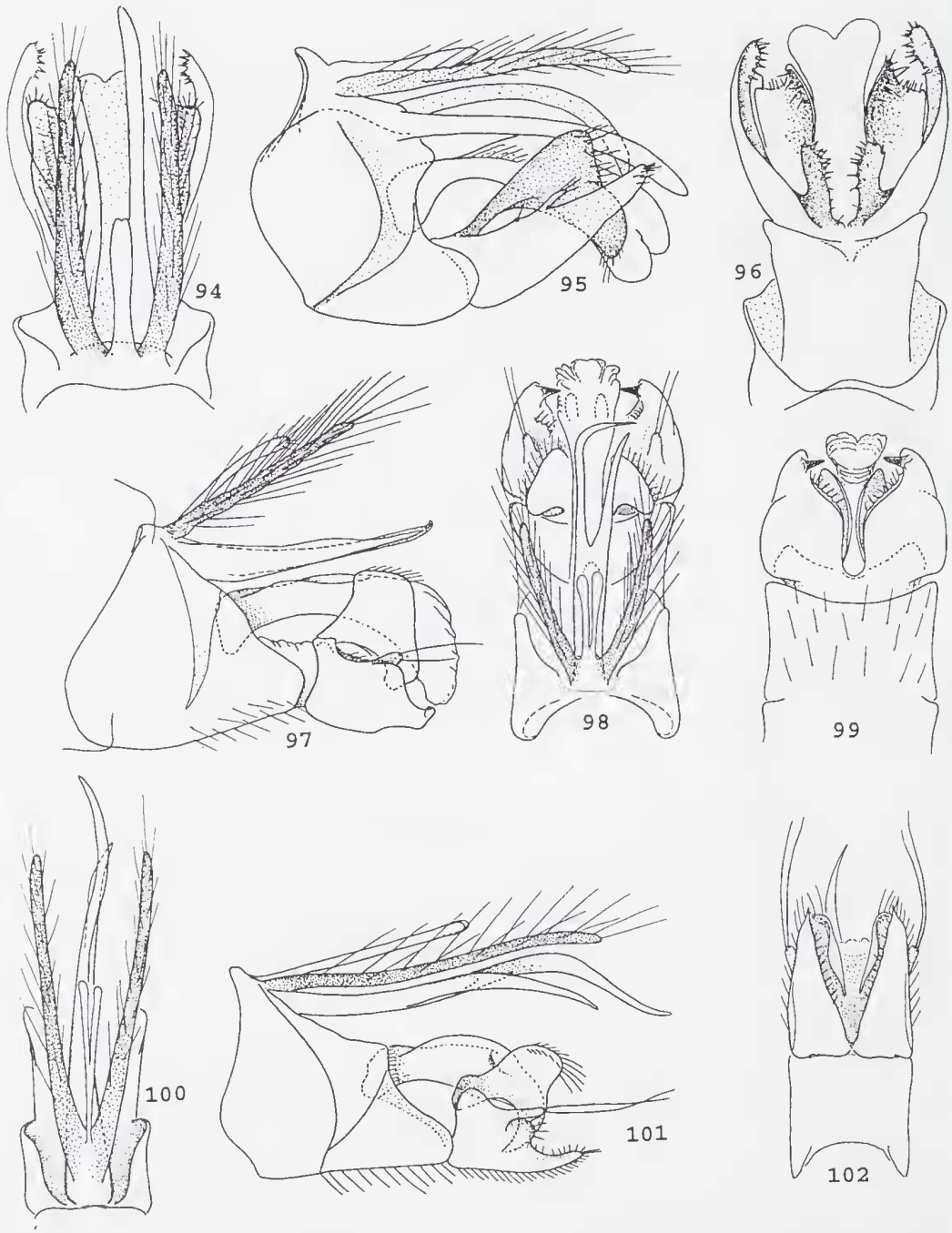
Figures 97–99

Material examined. Holotype ♂, N Queensland, 16 km W Ravenshoe, 2 Jan 1975, M.S. Moulds, (NMV, T-16324, genitalic prep. PT-2040 illustrated).

Diagnosis. This species groups with *T. notalia* sp. nov., *T. wannonense* sp. nov. and *T. forficata* sp. nov. in form of male genitalia but is distinguished by the form of the inferior appendages which in ventral view are broadly rounded in the basal two-thirds and have a dark spur on the inner apical margin.

Description. Length of forewing, ♂ 6.3 mm.

Genitalia, male (Figs 97–99). Abdominal segment IX with an incomplete oblique groove. Tergum X comprising a pair of short digitiform lobes above the spines which are fused in basal half and free, unequal and slender distally. Inferior appendages in ventral view stout and rounded basally, constricted at about two-thirds length and tapered distally with a dark spur on inner apical margin; lateral basodorsal process short with a pair of apical setae; mesodorsal lobe reduced to no more than a slight rounding of the margin of



Figures 94–102, male genitalia: 94–96, *Triaenodes cuspiosa* sp. nov., dorsal, lateral and ventral views; 97–99, *Triaenodes probolia* sp. nov., lateral, dorsal and ventral views; 100–102, *Triaenodes notalia* sp. nov., dorsal, lateral and ventral views.

Other material. Victoria: 3 ♂, Yarra River nr Burnley, Jan 1951, A. Neboiss, (NMV); 1 ♂, Franklin River, Toora, 6 Mar 1953, A. Neboiss, (NMV); 4 ♂, 2♀, Plenty River, South Morang, 6 Dec 1953, A. Neboiss, (NMV); ♂♂, ♀♀, Thurra River, Cape Everard, 22 Mar 1970, A. Neboiss, (NMV); ♂♂, ♀♀, LaTrobe River survey, 1973–1980, Morwell-Moe area, (NMV); ♂♂, ♀♀, Tanjil River, 1973–1980, lower section localities, (NMV); 2 ♂, Tyers river, LaTrobe River, survey site 22, 24 Feb 1974, (NMV); 5 ♂, 2♀, Wingan River, 8 km S of Princess H-way, 30 Jan 1975, A. Neboiss, (NMV); 6 ♂, Genoa Creek, 5 km W of Genoa, 31 Jan 1975, A. Neboiss, (NMV); 1 ♂, 1♀, Yarra River, Woori Yallock, 25 Feb 1976, A. Neboiss, (NMV); ♂, below Upper Yarra Dam, 28 Feb 1976, A. Neboiss, (NMV); 4 ♂, 2♀, Tarwin River, east branch, Dumbulk, 8 Nov 1977, A. Neboiss, (NMV).

Australian Capital Territory: 3 ♂, 3♀, Paddys River, nr Tidbinbilla NP, 23 Oct 1995, P. Murray and A. Wells.

Diagnosis. This species differs from *T. cuspiosa* in having the mesal basodorsal process on the inferior appendages more rounded dorsally and attenuate apically, but not so strongly sickle-shaped as in *T. wannonense*.

Description. Male antennal scape 1.5 × length of head, dorsally a long slit covered by a membranous flap. Length of forewing, ♂ 6.3–6.7 mm.

Genitalia, male (Figs 100–102). Abdominal segment IX with a deep oblique groove and dorsally an extensive membranous area. Tergum X comprising a slender upper part, forked at about half length of superior appendages; ventral spines unequal, fused in basal half, distally lying one above other. Superior appendages about length of shortest spine, elongate, slender. Inferior appendages stout in basal section, attenuate apically in lateral view; mesodorsal lobe short, rounded; lateral basodorsal lobe short, digitiform with a pair of long apical setae; mesal basodorsal process strongly hooked, stoutly humped dorso medially. Phallus slightly down turned, dilated in mid section.

Etymology. From the Latin *notalis*—southern, referring to the distribution of this species.

Remarks. This species is common in the Yarra River valley in central Victoria and throughout eastern Victoria, and has also been collected in the Australian Capital Territory. All the Victorian records are grouped between December and April, the ACT one is dated October.

Triaenodes vespertina sp. nov.

Figure 103

Material examined. Holotype, ♂, Victoria, Forrest, 19 Jan 1956, A. Neboiss, (NMV, T-16279).

Paratypes: 8 ♂, same data as for holotype (NMV, genitalic prep. PT-806 illustrated).

Other material. Victoria: ♀, same data as for holotype; ♂, Moorabool River, Durdidwarrah Road, 25 Mar 1953, A. Neboiss, (NMV); 4 ♂, ♀, Greendale, 6 Jan 1956, A. Neboiss, (NMV).

Diagnosis. Similar to *T. wannonense* in most features of male genitalia, but with the mesal basodorsal process of inferior appendage more rounded and spines of ventral part of tergum X more deeply separated.

Description. Length of forewing, ♂ 5.9–6.5 mm.

Genitalia, male (Fig. 103). Abdominal segment IX with a long groove and extensive membranous area dorsally clearly separating upper and lower genitalic parts. Tergite X comprising a median dorsal structure above a pair of deeply divided elongate spines. Superior appendages narrow, about as long as spines. Inferior appendages stout in basal section, in lateral view triangular apically; mesodorsal lobe strongly reduced; lateral basodorsal process short, digitiform with 2 long apical setae; mesal basodorsal process roundly humped medially and distally strongly and sharply down-turned, acuminate apically. Phallus about equal width throughout length, almost straight.

Etymology. The Latin *vespertina*—evening, western, in reference to its more westerly distribution in comparison with *T. notalia*.

Remarks. This species has been collected only from the Otway Ranges and from between Ballarat and Geelong districts in Victoria.

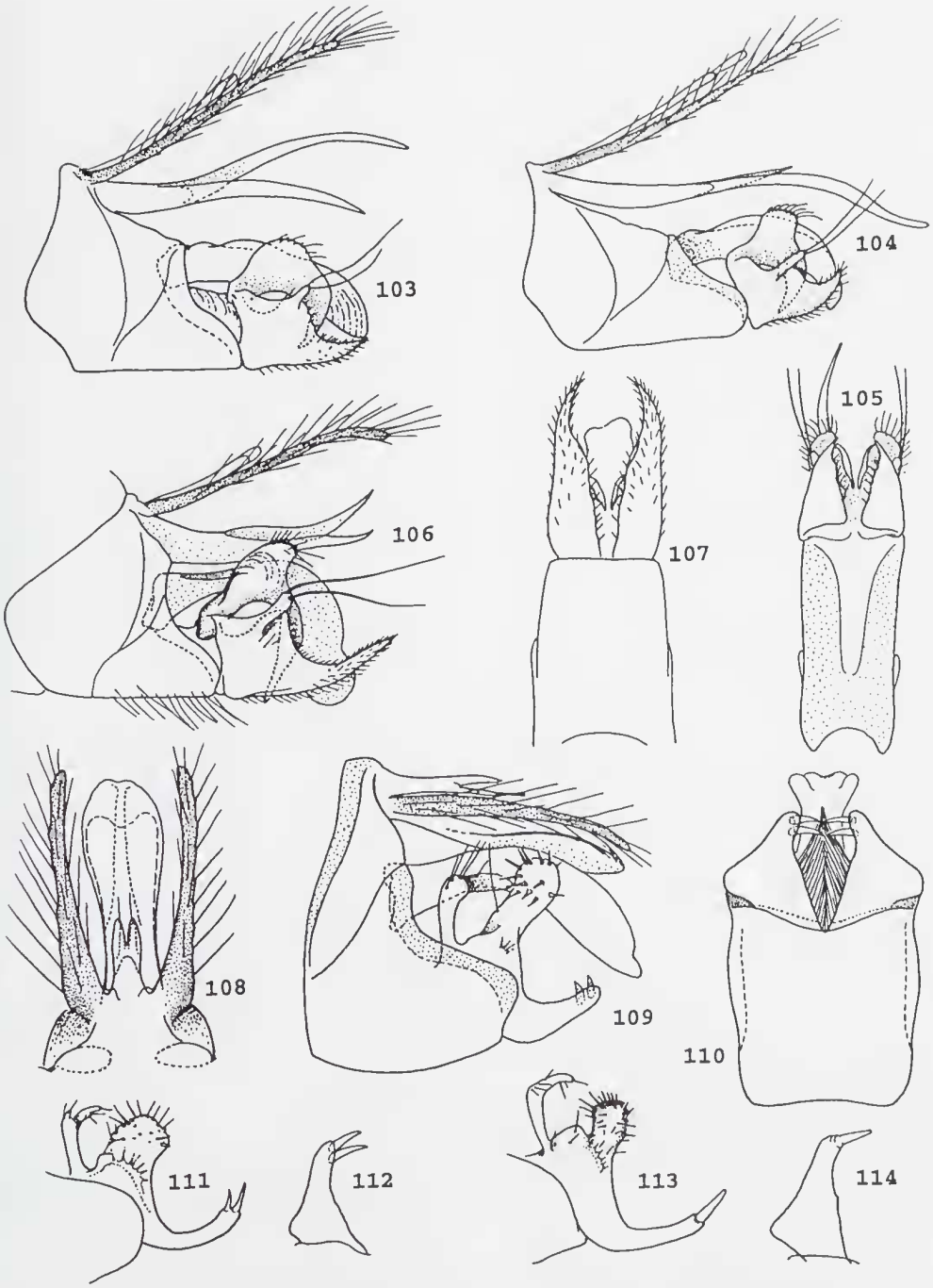
Triaenodes wannonense sp. nov.

Figures 104, 105

Material examined. Holotype ♂, Victoria, Wannon River, 25 km S of Halls Gap, Grampians, 10 Dec 1976, J.E. Bishop, (NMV, T-16248).

Paratypes: 40 ♂, same data as for holotype, (NMV, ANIC, genitalic prep. PT-804 illustrated).

Other material. Vic., 5 ♂, Stokes River, 8 km N of Dartmoor, 23 Nov 1977, P. Suter, (NMV); 1 ♂, Hopkins River, Hopkins Falls, 6 Mar 1978, A.A. Calder, (NMV).



Figures 103–114, male genitalia: 103, *Triaenodes vespertina* sp. nov., lateral view; 104, 105, *Triaenodes wannonense* sp. nov., lateral and ventral views; 106, 107, *Triaenodes forficata* sp. nov., lateral and ventral views; 108–110, *Triaenodes triquetra* sp. nov., dorsal, lateral and ventral views; 111–112, *Triaenodes triquetra* sp. nov. (PT-1116 – Paluma Range), inferior appendages lateral and ventral views; 113, 114, *Triaenodes triquetra* sp. nov. (PT-1745 – Yuccabine Creek), inferior appendages lateral and ventral views.

Diagnosis. This species closely resembles *T. notalia* from which it is distinguished in the male by the more delicate shape of the mesal basodorsal process on the inferior appendages and longer upper part of tergum X.

Description. Length of forewing, ♂ 6.4–7.0 mm.

Genitalia, male (Figs 104, 105). Abdominal segment IX ventrally narrowly elongate rectangular, longer than inferior appendages, with a deep oblique groove laterally and pronounced posterior extension resulting in considerable separation of upper and lower genitalic parts. Tergum X comprising a short, deeply divided upper part about half the length of the superior appendages; ventral spines fused basally, right spine less than half length of left. Superior appendages filiform. Inferior appendages stout in basal section, tapered to acuminate apices; mesodorsal lobe strongly reduced; lateral basodorsal process digitiform with a pair of long setae apically; mesal basodorsal process strongly and sharply hooked, roundly and stoutly humped dorsomesially. Phallus curved, slightly stouter in middle than proximally or distally.

Etymology. Named for the type locality.

Remarks. Triaenodes wannonense has been collected only in the Grampians area of Victoria.

Triaenodes forficata sp. nov.

Figures 106, 107

Material examined. Holotype, ♂, Victoria, Deddick River, half km above Snowy River junction, 13 Dec 1976, A. Neboiss, (NMV, T-16288).

Paratypes, Victoria: ♂, same data as for holotype, NMV, genitalic prep. PT-722); ♂, Towong, 28 Jan 1957, A. Neboiss, (NMV); ♂, same locality and collector, 29 Jan 1957, (NMV); 6 ♂, Tambo River at Tambo Crossing, 24 Jan 1960, A. Neboiss, (NMV); ♂, Mitta-Mitta River-Snowy Creek junction, 3 Nov 1975, A.A. Calder, (NMV); ♂, Genoa River, nr Wangarabell, 18 Mar 1977, A. Neboiss, (NMV, genitalic prep. PT-753 illustrated); ♂, Murray River, Indi bridge, Bigarra, 22 Jan 1988, J.E. Brittain, (NMV).

Other material. Queensland: 6 ♂, (2♀), Camp Mountain, 31 Mar 1967, N. Dobrotworsky, (NMV); 2 ♂, Bouloumba Creek, 8 km SW Kenilworth, 26°39'E 152°39'E, 12 Dec 1984, G. Theischinger, (NMV); 5 ♂, (♀), Crows Nest Falls, N of Toowoomba, 27°14'S, 152°07'E, 18 Jan 1986, G. Theischinger, (NMV); 18♂, Carnarvon Gorge National Park, 12 Nov 1990, G. Theischinger, (NMV).

New South Wales: ♂, Clarence River at Yates Crossing, 26 Oct 1981, Wells and Carter, (NMV); 2 ♂, Styx River at forest camp in Styx State Forest, 28 Oct 1981, Wells and Carter, (NMV).

Diagnosis. This species groups with *T. notalia* sp. nov., *T. probolia* sp. nov., and *T. wannonense* sp. nov. in general form of male genitalia but has the inferior appendages and their mesal basodorsal lobe far more attenuate apically, and abdominal segment IX stouter, with only a small membranous area dorsally.

Description. Length of forewing, ♂ 6.4–6.6 mm.

Genitalia, male (Figs 106, 107). Abdominal segment IX with the oblique groove less pronounced, producing a more normal separation between genitalic parts. Tergite X with upper part about half length of superior appendages, bifid apically; spines short, fused in basal half, unequal, left slightly shorter than right, curved to cross over right. Superior appendages narrow, longer than all other genitalic structures. Inferior appendages stout in basal section, apically forceps-like in ventral view, in lateral view slender and tapered to apex; mesodorsal lobe absent; lateral basodorsal process digitiform, with a pair of elongate setae apically; mesal basodorsal process strongly arched downwards, apically slender, spiny, middorsally produced into a pronounced hump. Phallus elongate, strongly curved downwards.

Etymology. From the Latin *forficatus*—scissor-shaped, in reference to the ventral part of tergum X.

Remarks. This is one of the two most widespread of all Australian *Triaenodes* species, occurring from central Victoria to southern Queensland.

Triaenodes triquetra sp. nov.

Figures 108–114

Material examined. Holotype ♂, North Queensland, Cape York Peninsula, Lockerbie Scrub, 15 Apr 1975, M.S. Moulds, (NMV, T-16209).

Paratypes: 7 ♂, same data as for holotype, (NMV, genitalic prep. PT-762 illustrated); 11 ♂, same locality, 13–27 Apr 1973, S.R. Monteith, (ANIC).

Other material. North Queensland: ♂, Bluewater State Forest, S end Paluma Range, WNW Townsville, 31 Jan 1981, M.S. Moulds, (NMV, genitalic prep. PT-1116 illustrated); ♂, Yuccabine Creek, Kirrama State Forest, 5 Mar 1985, R. Pearson (NMV, genitalic prep. PT-1745 illustrated).

Diagnosis. This species is distinct from all others in the Australian fauna and can be recognised by the stout spur-like setae on the mesal subapical margin of the inferior appendages.

Description. Length of forewing, ♂ 5.2–5.7 mm.

Genitalia, male (Figs 108–114). Abdominal segment IX quadrate in ventral view, an oblique upper-lateral suture divides the segment, which is produced posteroventrally but without a membranous area dorsally. Segment X comprising a very short bifid structure above a pair of digitiform setose processes and a ventral membranous plate of about the same length as the superior appendages. Superior appendages elongate, rather stout basally. Inferior appendages unusual in shape and difficult to interpret: the ventral-most lobe is subtriangular in ventral view, with paired stout setae apicomesally and is probably homologous with the apical region of other species; in lateral view a club-shaped median lobe bears bristle-like setae distally and probably represents the mesodorsal lobe; a narrower, mesally directed dorsal lobe with a pair of unequal processes apically, is here interpreted as representing the mesal basodorsal process; lateral basodorsal lobe absent. Phallus long, down-turned, slightly swollen distally.

Etymology. From the Latin *triquetrus*—triangular, in reference to the triangular shape of the inferior appendages in ventral view.

Remarks. This species is described from far northeastern Queensland, but two closely similar males from Paluma/Yuccabine Creek further south in Queensland are also referred to *T. triquetra* although most of the male genitalic parts show some differences in shape, particulary in proportions (see Figs 111–114).

uvida complex

Another set of species within the *intricata*-group, the *uvida* complex (referred to by Neboiss and Wells (1996) as "group D") (see Figs 115–130) includes five Australian species, *T. uvida* sp. nov., *T. nesiotina* sp. nov., *T. torresiana* sp. nov., *T. nymphaea* sp. nov. and *T. melanopeza* sp. nov., all with inferior appendages basically comprising four lobes, the dorsal one being highly irregular in shape. Members of the complex are widespread, occurring in Victoria, eastern Queensland and NW Western Australia.

Triaenodes uvida sp. nov.

Figures 115–117

Material examined. Holotype, ♂, Victoria, Cabbage Tree Creek, 8 Feb 1961, N. Dobrotworsky, (NMV, T-16354, genitalic prep. PT-751 illustrated).

Paratype, Victoria: ♂, Cann River, 23 Jan 1962, N. Dobrotworsky, (NMV).

Diagnosis. In form of male genitalia, *T. uvida* sp. nov. most closely resembles *T. nymphaea* but its inferior appendages are rounded on the inner margin in ventral view and have the basal angular extension on the mesal basodorsal process exaggerated such that they form wing-like structures.

Description. Length of forewing, ♂ 6.1 mm.

Genitalia, male (Figs 115–117). Abdominal segment IX lateral groove distally placed, segment quadrate in ventral view. Tergum X with a very short triangular upper part, ventral part forming a pair of overlapping spines. Superior appendages half length of spines of tergum X. Inferior appendages in ventral view with basal section subglobular; apicolaterally a short digitiform lobe; mesodorsal lobe triangular in ventral view, with inner margin bordered by peg-like setae; lateral basodorsal process slender, elongate, with a tuft of setae apically; mesal basodorsal process comprising a long curved lobe with its apex rounded beyond an apical swelling with an upwardly directed "beak", a downwardly directed flange towards the base, and a slender mesally directed lobe. Phallus stout, slightly expanded distally, apically blunt.

Etymology. From the Latin *uvida*—wet, damp, referring to conditions around type locality.

Remarks. Found only in southeastern Victoria.

Triaenodes nymphaea sp. nov.

Figures 118–120

Material examined. Holotype, ♂, Western Australia, Lily Creek, 15 km W of Kunanurra, 22 Feb 1977, J.E. Bishop, (NMV, T-16451).

Paratypes, Western Australia: 2 ♂, same data as for holotype (NMV, genitalic prep. PT-755 illustrated); 2 ♂, Spillway Creek, Kimberley, 2 Feb 1978, J.E. Bishop, (NMV); 2 ♂, Stonewall Creek, Kimberley, 2 Feb 1978, J.E. Bishop, (NMV); 2 ♂, same locality and collector, 4 Feb 1978, J.E. Bishop, (NMV); ♂, Fine Springs Creek, 2 Feb 1978, J.E. Bishop, (NMV).

Diagnosis. This species closely resembles *T. uvida* but is distinguished by the subtriangular appearance of the inferior appendages in ventral view and less prominent "wings" on the mesal basodorsal process.

Description. Length of forewing, ♂ 5.4–5.6 mm.

Genitalia, male (Figs 118–120). Abdominal segment IX with small lateral grooves, in ventral view width about twice length. Tergum X with upper part reduced to a small triangular plate dorsal to base of superior appendages or rarely with

a vestige of the more usual bifid process; spines crossing distally, separated in basal third by a membranous plate with rounded apex. Superior appendages narrow. Inferior appendages broad-based, mesodorsal lobe well developed and giving rise to the subtriangular appearance of the inferior appendages in ventral aspect, a row of peg-like setae on inner margin; lateral basodorsal process stout, rounded and with 3 to 4 moderate length setae apically; mesal basodorsal process in ventral view slender, with an inner margin hook towards base, distally beak-shaped, in lateral view expanded in distal half and divided apically to form a down-turned spur-like process and dorsally a stouter process angled upwards apically. Phallus dilated in distal half, down-turned and tapered apically.

Etymology. The Latin name of water lilies, *Nymphaea,* for the name of the creek beside which the type was taken.

Remarks. Known only from the Kimberley region of northwestern Western Australia.

Triaenodes melanopeza sp. nov.

Figures 121–123

Material examined. Holotype, ♂, N Queensland, Iron Range, Middle Claudie River, 2–9 Oct 1974, M.S. Moulds, (NMV, T-16465).

Paratypes, North Queensland: 9 ♂, same data as for holotype, (NMV, genitalic prep. PT-767 illustrated); ♂, same loc., 14 Sep 1974, M.S. Moulds, (NMV); 5 ♂, Little Mulgrave River, 28 Jun 1971, E.F. Riek, (ANIC, NMV); 3 ♂, Iron Range, 6 km N in dry scrub, 15 Sep 1974, M.S. Moulds, (NMV); 2 ♂, Iron Range, 24 Sep 1974, M.S. Moulds, (NMV); ♂, Iron Range, Gordon Creek, 16 Oct 1974. M.S. Moulds, (NMV); 2 ♂, Shiptons Flat, 15°47'S, 145°14', 17–19 Oct 1980, J.C. Cardale, (ANIC); 3 ♂, Bellenden Ker Range, Cable Base Station, 10 m asl, 17–24 Oct 1981, Earthwatch expedition, (QM); 3 ♂, 8–10 km E by N Mt Tozer, 5–10 Jul 1986, J.C. Cardale, (ANIC); ♂, Iron Range, Claudie River, 10 Nov 1988, K. Walker, (NMV); ♂, Cairns, Lake Morris Road, 16 Nov 1988, K. Walker, (NMV); 3 ♂, 8–11 km W by N Bald Hill, McIlwraith Range, 500 m asl, 26–27 Jun 1989, I. Naumann, (ANIC).

Other material. Queensland: ♂, 22 mls SW Ingham, 5 Jun 1961, R. Straatman, (dry mounted), (ANIC); ♂, 25 mls SW Ingham, Forestry road, 18 Apr 1961, R. Straatman, (ANIC); 2 ♂, Goodart Creek, Kirama State Forest, May 1993, G. Theischinger, (NMV).

Diagnosis. Males of this species are distinctive, making grouping difficult. On the basis of the form of abdominal segment IX we have placed *T. melanopeza* sp. nov. in the *uvida* complex, however, in features of the inferior appendages and tergum X it is distinctive. Males can be recognised by the long, distally inturned and somewhat pincer-shaped lateral lobes on the inferior appendages.

Description. Length of forewing, ♂ 6.5–7.3 mm.

Genitalia, male (Figs 121–123). Abdominal segment IX with a short lateral groove, in ventral view subquadrate. Tergum X comprising a slender, apically setose upper process about two-thirds length of paired slender spines arising laterally at its base, ventrally a broad membranous plate which is expanded laterally at the base and medially and divided apically. The inferior appendages comprise three main parts, the lateral ones probably being simply the posteroapical extension of the inferior appendages into pincer-like processes, mesoventrally the expanded mesodorsal lobes and dorsal to them, the lateral basodorsal processes. According to this interpretation, the mesal basodorsal processes have been lost. This structure may be represented by the pair of spines that appears to be associated with the phallus. Phallus with a pair of spines dorsally.

Etymology. From the Greek *peza*—border, edge, in reference to the black costal margin of the forewing.

Remarks. This is a commonly collected species in NE Queensland and closely resembles a New Guinean species, *T. costalis* Kimmins, 1962. Despite the distinctive form of the phallus of these two species, we are presently grouping them here on the basis of the general appearance of the other features. Future studies on the genus may lead to revision of this arrangement.

Triaenodes nesiotina sp. nov.

Figures 124–127

Material examined. Holotype, ♂, SE Queensland, Bulimba Creek, nr Brisbane, Kinmax Street riffle Site R1, 23 Oct 1979, (no collector given), (NMV, T-16340).

Paratypes, SE Queensland: 2 ♂, same data as for holotype (NMV, genitalic prep. PT-722 illustrated); 9 ♂, Fraser Island, Wanggoolba Creek, Central Station, at light, 19 Dec 1979, K.J. Lambkin, (NMV).

Other material. ♂, SE Qld, Searys Creek, Rainbow Beach, 25°58'S, 153°04'E, 9 Jan 1986, G. Theischinger, (NMV).

Diagnosis. In general appearance of male genitalia, this species is closely similar to

T. torresiana sp. nov., *T. uvida* sp. nov. and *T. nymphaea* sp. nov. It is distinguished by the simpler appearance of the male genitalia which have inferior appendages with apicolateral angles produeed into narrow lobes, mesal basodorsal process rounded apically, not spurred and upturned, and no lateral flanges.

Description. Length of forewing, ♂ 5.3–6.4 mm.

Genitalia, male (Figs 124–127). Abdominal segment IX with small grooves lateral to which the eutiele is produeed into pronouneed lobes. Tergite X comprising a short upper bilobed proeess above a membranous plate whieh separates the pair of ventral spines for about half their length. Superior appendages slender, slightly longer than membranous seetion of tergum X. Inferior appendages in lateral view eomprising 4 parts, 3 of which are regular lobose structures—the narrow apical region, a well developed mesodorsal lobe and the lateral basodorsal proeess; the fourth and upper-most, the mesal basodorsal proeess is slender at its base and expanded below the aeute apex to form a rounded lobe posteriorly and a ventral spine. Phallus slightly expanded and eurved downwards distally, shallowly bifid apieally.

Etymology. From the Greek *nesiotes*—insular, for the island locality from which some of the paratypes were collected.

Remarks. This speeies is known only from southeastern Queensland.

Triaenodes torresiana sp. nov.

Figures 128–130

Material examined. Holotype, ♂, N Queensland, Lockerbie Scrub, 16 Apr 1975, M.S. and B.J. Moulds, (NMV, T-16460).

Paratypes, N Queensland: ♂, same data as for holotype, (NMV); 4 ♂, Lockerbie area, 13–27 Apr 1973, S.R. Monteith, (NMV, genitalic prep. PT-800 illustrated); 2 ♂, Station Creek, 15 km N Mt Molloy, 22 Jan 1981, M.S. and B.J. Moulds, (NMV).

Other material. N Queensland: 2 ♂, Bluewater State Forest, S end of Paluma Range, WNW of Townsville, 31 Jan 1981, M.S. Moulds, (NMV); ♂, Mt Spec State Forest, Running Water, 640 m asl, 16 Mar 1994, A.L. Sheldon, (NMV).

Diagnosis. Triaenodes torresiana sp. nov. shows what appears to be a further development of the genitalie elaborations seen in *T. nymphaea*. The mesodorsal lobe of the inferior appendages is prominent above the almost globular basal part and the lateral flanges on the mesal basodorsal proeess are more distad and well developed to form subapieal flanges.

Description. Length of forewing, ♂ 5.2–5.4 mm.

Genitalia, male (Figs 128–130). Abdominal segment IX with a lateral groove. Tergum X with upper process reduced almost completely to a small, rounded strueture; spines stout, separated in basal third by a membranous plate whieh is broadly rounded apieally. Superior appendages half to two-thirds length of spines of tergum X. Inferior appendages in ventral view subglobular in basal seetion; mesodorsal lobe well developed, in ventral view triangular with inner margin bordered by bristle-like setae, in lateral view, club-shaped; lateral basodorsal process digitiform; mesal basodorsal proeess in lateral view with a slender dorsal spine, ventral portion in form of a pair of slender lobes, one eurving anteriorly, the other with apex directed upwards. Phallus stout, slightly expanded distally, apically blunt.

Etymology. Named in reference to the Torresian zoogeographic provinee in Australia.

Remarks. Triaenodes torresiana has been collected only from northeastern Queensland.

***doryphora*-complex**

In another small subset of the *intricata*-group (referred to by Neboiss and Wells (1996) as "group E"), evolution of the inferior appendages appears to have taken a different course. They have developed into elaborately lobed structures, some of which show glimpses of similarities to species of the *uvida* complex and others to species of the *bernaysae* complex. Five Australian speeies are included (see Figs 131–142): *T. laciniata* sp. nov., *T. doryphora* sp. nov., *T. empheira* sp. nov., *T. tenerata* sp. nov., and *T. ataloma* sp. nov. Homologies of parts are difficult to ascertain, but it appears that in this complex the mesodorsal lobe on the inferior appendages has shifted to a ventrolateral position, the lateral basodorsal process is above it and the elaborate upper mesal process is the mesal basodorsal process.

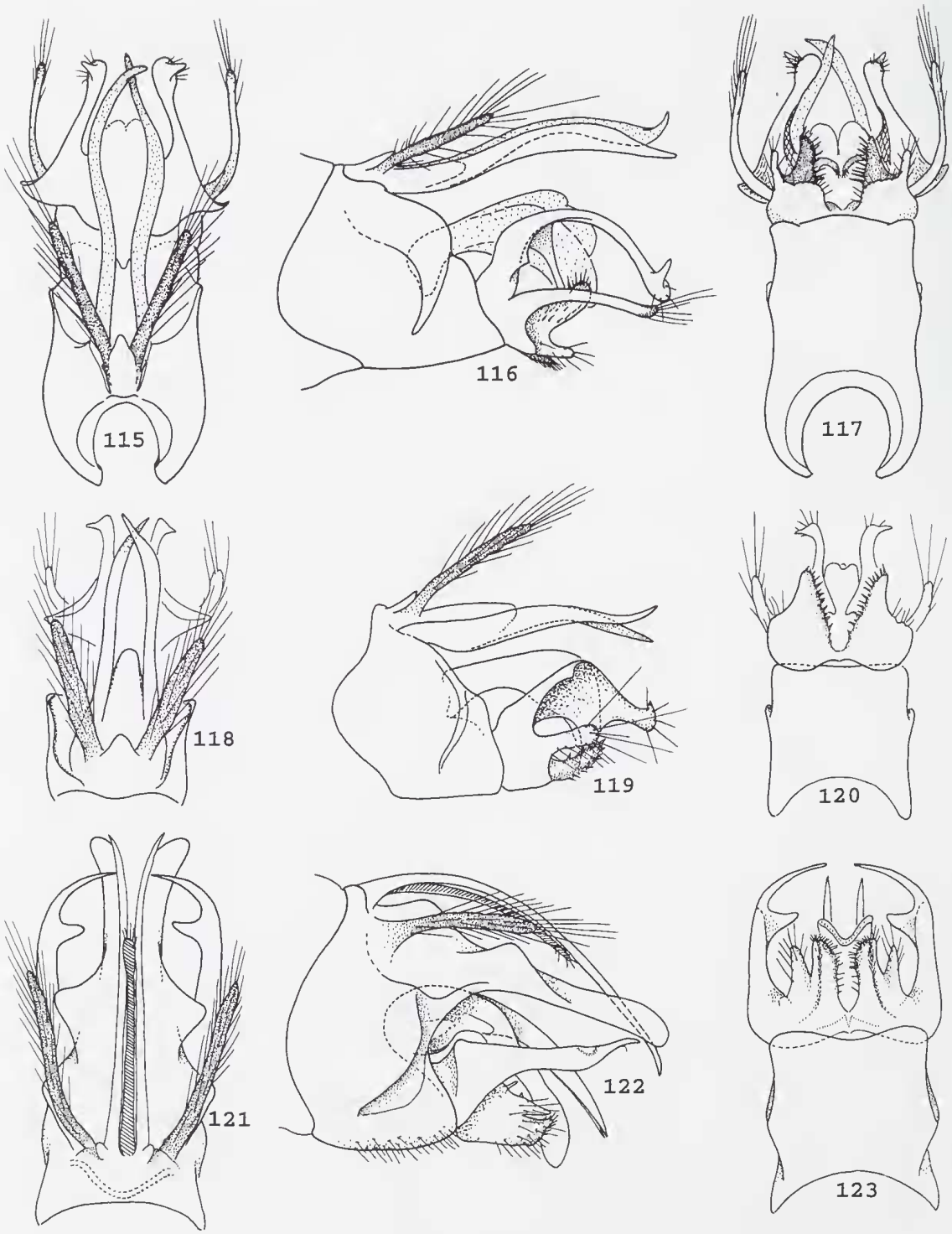
Species in this set all occur in northeastern Queensland.

Triaenodes doryphora sp. nov.

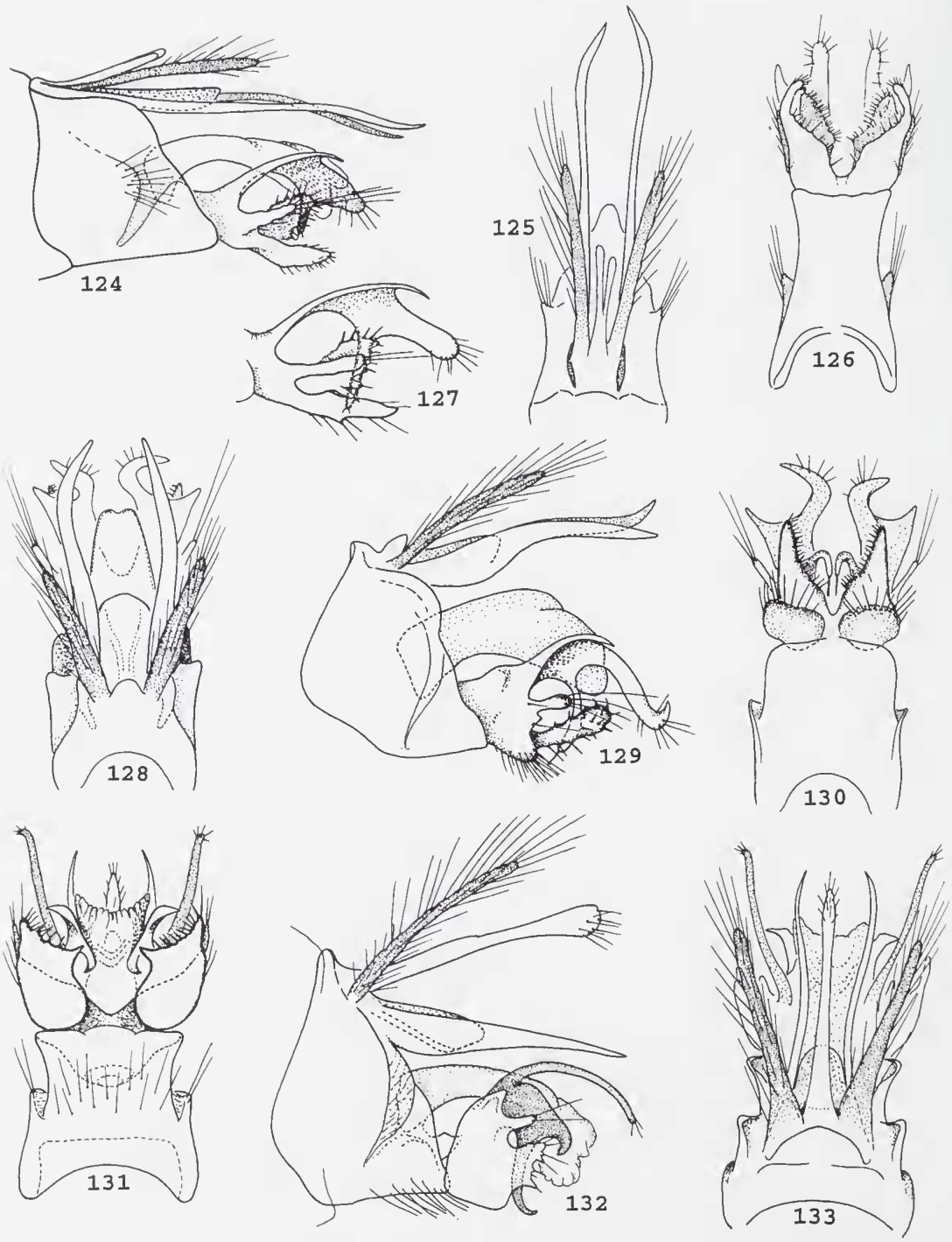
Figures 131–133

Material examined. Holotype, ♂, North Queensland, 2 km S by W Millaa Millaa, 15 May 1950, I.D. Naumann and J.C. Cardale, (ANIC, genitalic prep. PT-1122 illustrated).

Paratype: ♂, N Queensland, Bellenden Ker Range, Cableway Base Station, 100 ♂ asl, 17 24 Oct 1981, Earthwatch, (QM, genitalic prep. PT-1091).



Figures 115–123, male genitalia: 115–117, *Triaenodes uvida* sp. nov., dorsal, lateral and ventral views; 118–120, *Triaenodes nymphaea* sp. nov., dorsal, lateral and ventral views; 121–123, *Triaenodes melanopeza* sp. nov., dorsal, lateral and ventral views.



Figures 124–133, male genitalia: 124–126, *Triaenodes nesiotina* sp. nov., lateral, dorsal and ventral views; 127, *Triaenodes nesiotina* sp. nov., inferior appendage, lateral view of PT-758 – Fraser Island; 128–130, *Triaenodes torresiana* sp. nov., dorsal, lateral and ventral views; 131–133, *Triaenodes doryphora* sp. nov., ventral, lateral and dorsal views.

Diagnosis. Closely resembling *T. laciniata* but distinguished particularly on the finer structure of the mesal basodorsal process of the inferior appendages.

Description. Length of forewing, ♂ 6.2–6.8 mm.

Genitalia, male (Figs 131–133). Abdominal segment IX with a short oblique groove laterally. Tergum X comprising a slender upper part with setae apically and a pair of equal spines separated for about half their length by a membranous plate. Superior appendages slender, more than three-quarter length of upper lobe of tergum X. Inferior appendages in lateral view with height greater than length, posterior margin irregular, intermediate lobe short digitiform, mesal basodorsal process with a slender, curved upper lobe, and a more or less calliper-shaped ventral lobe. Phallus narrow basally, dilated distally.

Etymology. From the Greek *doryphoros*—spear bearing, in reference to the spear-like processes of tergum X.

Remarks. This species is known only from north-eastern Queensland.

Triaenodes laciniata sp. nov.

Figure 134

Material examined. Holotype ♂, N Queensland, Davies Creek National Park, nr Mareeba, 27 Oct 1988, MV-light, K. Walker, (NMV, T-16423).

Paratypes, N Queensland: ♂, N Queensland, Mossman Gorge, 16 Jun 1971, E.F. Reik, (NMV, genitalic prep. PT-760 illustrated); ♂, Moses Creek, 4 km N by E Mt Finnigan, 15°47'S, 145°17'E, 14–16 Oct 1980, J.C. Cardale, (ANIC); ♂, Woodbadda River, 15°58'S, 145°22'E, 25 Aug 1992, at light, J.C. Cardale and P.Zborowski, (ANIC).

Diagnosis. Triaenodes laciniata sp. nov. is distinguished from the closely similar *T. doryphora* sp. nov. by a the more massive mesal basodorsal process on the inferior appendages and the form of tergum X.

Description. Length of forewing, ♂ 5.5–5.6 mm.

Genitalia, male (Fig. 134). Abdominal segment IX with a long oblique lateral groove effectively distancing the upper and lower genitalic parts. Segment X with a rather stout elongate upper part with setae on the slightly expanded, blunt apex; spines stout at base, may have a short subsidiary spine dorsally, a short membranous plate between spines. Superior appendages slender, elongate, as long as the dorsal lobe on tergum X. Inferior appendages in lateral view wide; apicodorsal angle produced slightly; lateral basodorsal process short with 2 setae apically; mesal basodorsal process with a slender, spiny basal lobe, and dorsal lobe slender, curved, elongate, with several short setae apically. Phallus stout, down-turned.

Etymology. From the Latin *lacinia*—lappet, fringe, in reference to the flap on the antennal scape.

Remarks. Triaenodes laciniata is known only from northeastern Queensland.

Triaenodes tenerata sp. nov.

Figures 135–137

Material examined. Holotype ♂, North Queensland, Bluewater State Forest, S end of Paluma range, WNW Townsville, 31 Jan 1981, M.S. Moulds, (NMV, T-16417, genitalic prep. PT-1117 illustrated).

Paratype: ♂, North Queensland, Little Cedar Creek, Mt Spec, 31 Jan 1965, E.C. Dahms, MV light, (QM, genitalic prep. PT-1118).

Diagnosis. This species is distinguished from others in the group by its uniquely bifid and curved ventral spines of tergum X.

Description. Length of forewing, ♂ 5.0–5.1 mm.

Genitalia, male (Figs 135–137). Abdominal segment IX short, with a long oblique groove laterally, but without development of a dorsal membranous area. Segment X comprising a narrow upper part with setae distally; ventrally spines well separated basally by a membranous plate, divided and twisting distally. Superior appendages stout at base, tapered distally. Inferior appendages broad-based, triangular in ventral view; lateral basodorsal process short with 2 short setae apically; mesal basodorsal process with a stout, down-turned inner basal lobe and a slender curved dorsal lobe. Phallus narrow, down-turned.

Etymology. From the Latin *tener*—soft, delicate, for the appearance of the male genitalia.

Remarks. This species is known only from north-eastern Queensland.

Triaenodes empheira sp. nov.

Figures 138, 139

Material examined. Holotype ♂, N Queensland, Tinaroo Dam, 27 Apr 1967, D.H. Colless, (ANIC, genitalic prep. PT-761 illustrated).

Diagnosis. Although this species is clearly associated with *doryphora*-group species, the form of the mesal basodorsal process on the inferior appendages is closely similar to that of

intricata-group members. This species is distinguished from *T. doryphora* and *T. laciniata* by the simpler, mesal basodorsal process which is only bilobed, and from *T. ataloma* sp. nov. by the small dorsal membranous area on abdominal segment IX.

Description. Length of forewing, ♂ 5.0 mm.

Genitalia, male (Figs 138, 139). Abdominal segment IX short, divided in lateral view by a groove but with only a very small membranous area dorsally. Segment X comprising a narrow elongate upper process, with setae on slightly swollen apex; ventrally paired spines separated by a short membrane. Superior appendages slender, elongate. Inferior appendages with basal section broad, triangular in ventral view; lateral basodorsal process short, a single short seta apically; mesal basodorsal process with a stout, down-turned basal lobe, and a slender curved dorsal lobe with a pair of short setae apically. Phallus narrow proximally, stouter distally, down-turned.

Etymology. From the Latin *emphereia*—likeness, in reference to the similarity of the species in this group.

Remarks. At present this species is known only from the type locality in northeastern Queensland.

Triaenodes ataloma sp. nov.

Figures 140–142

Material examined. Holotype ♂, N Queensland, Mt Spec State Forest, Birthday Creek above weir, 18°57'S, 146°10'E, 27 Jan 1994, lt tr., 820 m asl, A.L. Sheldon, (NMV, T-16338).

Paratype ♂, N Qld, Birthday Creek, 3.5 km WNW Paluma, 18°59'S, 146°10'E, 7 Apr 1990, at lt, R. St Clair, (NMV, genitalia prep. PT-2021 illustrated).

Diagnosis. Triaenodes ataloma sp. nov. resembles *T. tenerata* in general appearance of male genitalic parts, but the distal portion of abdominal segment IX is narrower and has an extensive and concertinaed membranous area distally, and the ventral spines of tergum X are undivided distally.

Description. Length of forewing, ♂ 5.3–5.9 mm.

Genitalia, male (Figs 140–142). Abdominal segment IX divided laterally into a proximal sclerite and a posteroventral part above which is a large area of concertinaed membrane. Tergum X comprising a slender upper part with setae distally, and ventrally a pair of elongate forceps-like spines which extend beyond the upper structure and the superior appendages. Superior appendages elongate, in ventral view almost parallel-sided. Inferior appendages more rounded at anterolateral angle than in tenerata, in lateral view almost truncate apically, lateral basodorsal process very short; mesal basodorsal process bilobed, in lateral view upper lobe slender, curving downwards, lower lobe skittle-shaped.

Etymology. From the Greek *atalo*—tender, delicate, referring to the soft, flexible part of segment IX; oma—designating condition.

Remarks. Triaenodes ataloma is known only from northeastern Queensland.

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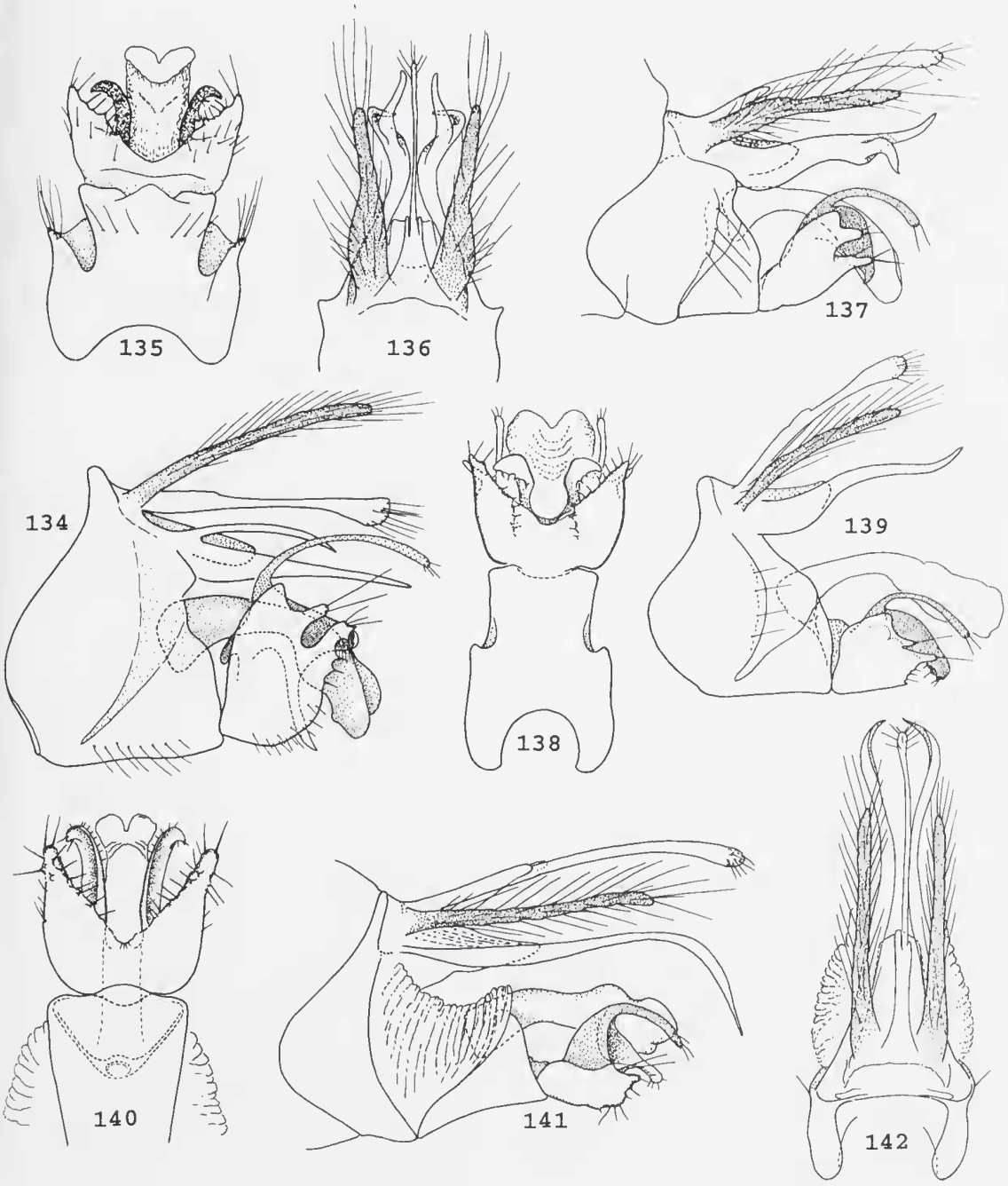

Figures 134–142, male genitalia: 134, *Triaenodes laciniata* sp. nov., lateral view; 135–137, *Triaenodes tenerata* sp. nov., ventral, dorsal and lateral views; 138, 139, *Triaenodes empheira* sp. nov., ventral and lateral views; 140–142, *Triaenodes ataloma* sp. nov., ventral, lateral and dorsal views.

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